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ABOVE THE TWENTY-MILLION MARK.

OUTPUT OF IRON CRE FROM LAKE SUPERIOR MINES DURING 1901 FOOTS UP 20 157,522 GROSS TONS BY WATER—RAIL SHIPMENTS WILL MAKE THE TOTAL PRACTICALLY TWENTY AND A HALF MILLIONS.

The twenty-million mark has been passed in iron ore shipments from Lake Superior mines. Official reports show a total of 20,157,522 gross tons moved by water in the season of 1901, and to this there will be added enough in rail shipments to make the grand total full 20,500,000 tons. Reports regarding rail shipments will not be available until the end of the year. These figures do not include 230,000 tons of ore shipped from the Clergue mines of the Michipicoten district in Canada. About 160,000 tons of this Canadian ore was shipped to Lake Erie ports for consumption in the United States and the balance of 70,000 tons to furnaces at Midland and Hamilton, Ont.

The principal gains over previous years are again at the ports through which the Mesabi ores of Minnesota are shipped. At Two Harbors, for instance, there is a gain of 1,010,903 tons over 1900, while Superior shows a again of 798,178 tons. Probably the most encouraging feature of the various summaries is the fact that notwithstanding the large increase in output of the mines, there is just a little less ore on Lake Erie docks now than there was at this time a year ago, and the outlook is for a continuance through the winter of furnace operations on a larger scale than at any time in the past. Shipments from the several upper lake ports during five years past are shown in the following table:

	1901.	1900.	1899.	1898.	1897.
Escanaba	4,022,668	3,436,734	3,720,218	2,803,513	2,302,121
Marquette	2,354,284	2,661,861	2,733,596	2,245,965	1,945,519
Ashland	2,886,252	2,633,687	2,703,447	2,391,088	2,067,637
Two Harbors	5,018,197	4,007,294	3,973,733	2,693,245	2,651,465
Gladstone	117,089	418,854	381,457	335,956	341,014
Superior	2,321,077	1,522,899	878,942	550,403	531,825
Duluth	3,437,955	3,888,986	3,509,965	2,635,262	2,376,064
Total, by lake	20,157,522	18,570,315	17,901,358	13,655,432	12,215,645
Total, all rail		489,078	350,446	369,241	253,993
Total shipments		19,059,393	18,251,804	14,024,673	12,469,638

In 1896, a year not included in the above table, the total shipments from Lake Superior mines, lake and rail, was 9,934,828 tons, so that the output has been more than doubled in a period of six years.

IRON ORE ON LAKE ERIE DOCKS.

THE AMOUNT IS NOT QUITE AS LARGE AS IT WAS A YEAR AGO—VERY HEAVY VOLUME OF DIRECT SHIPMENTS TO FURNACES DURING PAST SEASON.

Notwithstanding the 20,000,000-ton output of iron ore, stocks on Lake Erie docks are just a little less than they were at this time a year ago. The receipts at Lake Erie docks during 1901 aggregate 17,014,076 tons (gross tons always as regards iron ore), against 15,797,787 tons in 1900; and the balance on dock Dec. 1 of this year is 5,859,663 tons, against 5,904,670 tons on the same date a year ago. The remarkable feature of reports from the Lake Erie docks this year is the large proportion of the ore that passed over the docks to furnaces during the navigation season. The shipments to furnaces between May 1 and Dec. 1 of this year aggregate 14,204,596 tons, compared with 11,613,773 tons in the same period of 1900, 11,765,158 tons in 1899 and 9,059,829 tons in 1898. Of course it is understood that direct shipments to furnaces from vessels were very heavy during the past season, and the tendency each year is to increase the direct shipments, on account of increased storage capacity at the furnaces, but it is also true that the actual consumption of ore in the furnaces for several months past has been enormous, so that there is probably no more ore in furnace yards now than there was a year ago.

The shipments to furnaces during the navigation season above referred to, are determined in this way: First we have the amount of ore on Lake Erie docks before the opening of navigation on May 1 last, 3,050,183 tons; add to this the receipts of the season just closed, 17,014,076 tons, and the total is 20,064,259 tons; deduct the amount now on dock, 5,859,663 tons, and we have 14,204,596 tons as the amount that was forwarded, either direct or from dock, to the furnace yards.

It is understood of course that the difference between the output of 20,157,522 tons from the mines and the receipts of 17,014,076 tons at Lake Erie ports, is ore that went to places other than Lake Erie ports, principally the furnaces at South Chicago.

The following tables show receipts at Lake Erie ports and amounts on dock during six years past:

IRON ORE ON LAKE ERIE DOCKS, DEC. 1, GROSS TONS.

Ports.	1901.	1900.	1899.	1898.	1897.	1896.
Toledo	254,196	242,375	186,422	146,568	194,644	115,959
Sandusky	47,384	95,111	23,184	48,500	84,786	59,491
Huron	231,501	211,377	164,480	139,982	230,029	200,675
Lorain	195,863	251,838	337,822	324,034	317,509	231,288
Cleveland	1,378,060	1,337,445	1,200,806	1,175,970	1,478,355	1,419,311
Fairport	710,590	611,717	692,147	719,794	825,312	773,905
Ashtabula	1,769,145	1,811,459	1,902,598	1,732,671	1,835,694	1,441,666
Conneaut	604,106	630,514	468,808	288,101	360,895	275,800
Erie	470,718	480,734	361,335	439,167	484,871	355,222
Buffalo	198,100	232,100	192,681	121,620	111,660	82,267
Total	5,859,663	5,904,670	5,530,283	5,136,407	5,923,755	4,954,984

IRON ORE RECEIPTS AT LAKE ERIE PORTS, GROSS TONS.

Ports.	1901.	1900.	1899.	1898.	1897.	1896.
Toledo	798,298	645,147	792,348	414,012	416,438	301,794
Sandusky	33,017	154,542	87,499	136,200	79,792	58,667
Huron	431,311	321,914	263,600	126,755	198,231	226,515
Lorain	721,662	1,090,235	1,112,946	536,086	355,188	191,445
Cleveland	3,831,060	3,376,644	3,222,582	2,645,318	2,456,704	2,313,170
Fairport	1,181,776	1,085,554	1,241,013	912,879	1,008,340	941,446
Ashtabula	3,981,170	3,709,486	3,341,526	2,684,563	3,001,914	2,272,822
Conneaut	3,181,019	2,556,631	2,320,696	1,404,169	495,327	327,623
Erie	1,379,377	1,240,715	1,309,961	1,092,364	1,311,526	847,849
Buffalo / Tonawanda	1,475,386	1,616,919	1,530,016	1,075,975	797,446	545,101
Total	17,014,076	15,797,787	15,222,187	11,028,321	10,120,906	8,026,432

STRENGTH OF THE BRITISH NAVY.

In an interview in Washington Com'dr Richardson Clover, naval attache at the American embassy in London, declared that the naval forces of Great Britain are in a far more effective and efficient condition than the continental powers believe and that never in her naval development has England been stronger on the seas. Recent torpedo boat accidents have made little impression in British naval circles, he declares, and their program calls for the continued advance of the highest class of boats of the swiftest possible speed. Com'dr Clover says:

"The naval force that Great Britain is capable of exerting is equal today to that of any three continental powers and was never in a more efficient condition. The British service has been severely criticized, but much of this criticism as to its efficiency is due to a policy of the naval league and the press to depreciate in the mind of the public England's strength, in order that large appropriations may be secured for expanding the navy and to continue the policy of maintaining it equal to that of the combined strength of any two world powers. The policy in England seems to be to impress the public with the weakness rather than the strength of the British service, with a view to securing additional ships through misapprehension in the public mind that the force is not keeping pace with its importance to the nation.

"Here our policy seems to be to overestimate rather than underestimate our naval strength, which is not right. The people here seem impressed with the strength of the navy, especially since the Spanish-American war, when actually better results might be obtained before congress were the impression conveyed that we are not so strong. Abroad the United States is reckoned as the seventh naval power, being outranked by all the continental navies, including Italy. But this view is not accepted by the United States, and figures of ships building and tonnage indicate that the United States is now either fifth or tied with Germany for fourth place, being outranked by Great Britain, France and Russia. Germany however, has a more extensive program of increase than the United States and will probably lead us in a few years at her present rate of building unless liberal appropriations are made here for naval development. Ship for ship the new vessels of our navy equal in every respect those of the foreign services, but we have comparatively few. Abroad the United States, while, of course, reckoned as a naval power, cannot be said to be counted in any combinations that nations might make against others. The Spanish war did much to enhance our standing before European naval powers, but we are still regarded as entitled to no higher rank than seventh place, which would place us nearly alongside of Japan.

"England today is stronger than any two of the most powerful continental powers, and stronger than these with another power included. She has 80,000 men afloat, and although her naval reserve is not so strong and perhaps as well drilled as that of France, the real strength of her personnel is in the trained, disciplined men afloat, who are being constantly increased. Her channel fleet is a magnificent aggregation of fighting force, constantly kept at sea and ready for any assignment. The ships are always in excellent condition, and reports of weaknesses and rottenness are without the slightest semblance of truth. These reports are circulated by the naval league, an organization for the upbuilding of the British navy, with branches throughout the British islands. In fact, the admiralty will often refuse to officially deny statements of reported defects in the British navy, and rather encourages a feeling of depreciation of its strength than magnifying it. Last year men were employed by the admiralty to walk the populous thoroughfares of London with posters decrying the weakness of the British navy and containing statements of the terrible condition of the ships and ruin that would befall the nation if the navy was not strengthened. The posters were designed to create public sentiment among the people for more liberal appropriations and had some effect. The naval league in its publications magnifies purposely accidents and reports of weakness in ships.

PLANNING EARLY FOR ANOTHER YEAR'S BUSINESS.

It is more than probable that the big steel interests will try to place lake freights, as well as all other branches of the industry, on about the basis of the year just closing. It has, in fact, already been practically decided that the base price for iron ore will be the same as last year, $4.25 a ton, and the middle of January will probably see lake freight contracts closed for the bulk of the ore that is to be moved next year. On the 80-cent lake freight basis of the present year vessel owners looked for a very fair profit, but delays in port reduced their earnings to such an extent that their contracts did not give them anything like the returns they expected. They are therefore disposed to seek a better rate for the coming year but will necessarily be influenced by the position of the United States Steel Corporation on the score of freights, as that organization controlled about thirteen millions out of twenty millions of ore moved in the present year. From all that can be learned the officials of the steel corporation are disposed to hold close to the present year's prices on everything and to make arrangements for the new year's business as soon as possible.

A Word to the Advertiser.

THE annual ship building number of the Marine Review will be published on Jan. 9 next. In these annual editions are chronicled the current construction in the ship yards of the United States—not so much what has been built during the year but what is actually under way at the present time. It will be a living directory of the active yards. The value of this number to the manufacturer of ship yard equipment and supplies for ships cannot be overestimated. He can reach the entire market in this issue.

The advertising rates for this issue are:

Full page, - $40
Half page, - $25
Quarter page, $15

As the edition is to be issued January 9th, it will be necessary to reserve space at once.

The number will be beautifully printed and illustrated throughout, and will have a special cover in several colors. It will undoubtedly be the finest number that has ever been issued by a marine publication in the United States. The circulation of this number will be of the widest possible character. Indeed its circulation may be said to be complete, for it will reach everyone identified with ship building and ship owning in the United States.

Especial pains will be taken to make the edition attractive throughout. To this end the Marine Review will gladly design the advertising for its patrons free of charge. All it asks is the raw material in the shape of catalogues, photographs or other information.

Marine Review Publishing Co.,

Perry-Payne Building, ... CLEVELAND, OHIO.

An Acceptable Holiday Gift.

Patterson's Illustrated Nautical Encyclopedia.

THE Marine Review has just issued from its press a dictionary of sea terms under the title "Patterson's Illustrated Nautical Encyclopedia." It touches upon 5,000 nautical subjects and is embellished with 600 engravings. It covers the entire field of the sea and its ships—their construction and operation—and should prove an invaluable aid to those interested in this subject. Bradstreet's, one of the most carefully edited journals in the United States, has this to say of the book in its current issue:

"It has been the aim of the author to incorporate into his work a definition of every term which has to do with the sea and the vessels which sail upon it, from the canoe to the battleship. The first part gives the meaning of general sea terms. In the second part ship building terms are defined. A dictionary of terms used in navigation is given in a third part, and two other divisions of the work are devoted to terms used in marine engineering and naval terms respectively. The volume is illustrated with extreme liberality, over 600 illustrative engravings being included to elucidate the text. It should prove an excellent manual, not only for officers and men of the navy and the merchant marine, but for yachtsmen, admiralty lawyers and naval students, and the every day man, who, though not of the sea, yet wants to know something about ships and navigation, will find it not only useful and informing, but in a high degree attractive. No less than 5,000 nautical subjects are dealt with in the treatise, the author finding room for their inclusion by studying terseness in his definitions."

The price of this book is $3. We will deliver it anywhere in the world free of charge.

The Marine Review Publishing Co.,

Perry-Payne Building, ... CLEVELAND, OHIO.

The Hon. Peter White.

A Biographical Sketch of the Lake Superior Region.

THE Marine Review began publishing with its issue of Dec. 12 the biography of the Hon. Peter White of Marquette, Mich.; or to set it more properly out, has begun the history of the development of the iron regions of Lake Superior, for while the sketch is biographical in its nature it is inseparably linked with the development of this marvelous northern country, and the history of one cannot well be told without the other. It will be concluded in three numbers.

There will be much published that has never been told. Many facts will be brought out which make strange reading today, but which are nevertheless incontestible. The actual manuscripts of men, living and dead, having to do with the making of this country, have been examined, and what is interesting has been taken from them.

Fiction does not offer anything as fascinating as this tale of the men who did. The whole story revolves about the Hon. Peter White, because he is the only man whose life encompasses all of it. He was there in the beginning and he is there yet. His advent in the iron region was right upon the heels of the men who actually discovered the iron deposits. With about 20,000,000 tons of ore tumbling annually upon the docks on Lake Erie, the great gateway to the furnaces, it seems odd that 1,000 tons should ever have been regarded as an avalanche. Yet it is not so very long since 1,000 tons per annum represented the utmost output of a struggling company in the Lake Superior region.

The creation of railways, of docks, of canals—in fact the whole process of winning these deposits which have made the United States the great industrial nation that it is—will be told.

The whole work is an attempt to tell of a phase in the development of the lake region, which, if it is not preserved now, must inevitably perish. It lives now largely in the memory of a few men.

The copies containing the history will be mailed to any address upon receipt of 30 cents in stamps; or the copies containing the history, the forthcoming ship building edition and the Marine Review until Jan. 1, 1903, will be sent to any address for $3.

The Marine Review Publishing Co.,

418-419 Perry-Payne Building, ... CLEVELAND, OHIO.

SECRETARY GAGE ENDORSES THE SHIPPING BILL.

Secretary Gage's annual report shows that the national revenues last year amounted to $699,316,530.92 and the expenditures to $621,598,546.54, leaving a surplus of $77,717,984.38. The expenses were divided as follows: Civil establishment, $117,327,240.89; military establishment, including rivers and harbors, $144,615,697.20; naval establishment, $60,506,978.47; Indian service, $10,896,073.35; pensions, $139,323,621.99; interest on public debt, $32,342,979.04; deficiency in postal revenues, $4,954,762.21; postal service, $111,631,193.39. Compared with the fiscal year 1900 the receipts increased $29,721,099.74 and the expenses $22,253,561.44.

The secretary urges the necessity for providing a retired list for aged and infirm officers of the revenue cutter service and the enactment of a measure of relief. He also calls specific attention to the fact that the old vessels of the revenue cutter fleet should be replaced. He says:

"The old, obsolete and in other respects inefficient vessels of the revenue cutter service are a source of constant anxiety, not only because they are not adapted to the work of the service and cannot be depended upon in emergencies, but because of the annual expenditures required to keep them afloat and in commission, can only be justified upon the ground that the active presence of cutters on stations is essential to the public interests. These vessels are anything rather than efficient revenue cutters; they are discreditable to the department and furnish subject for criticism. Of this class are the following:

"The Woodbury, constructed in 1864: Original cost, $92,000; since for repairs, $94,339; total cost to June 30, 1901, $186,339.

"The McLane, purchased in 1865: Original cost, $36,000; for repairs, $117,876; total cost to June 30, 1901, $153,876.

"The Hamilton, constructed in 1871: Original cost, $65,000; for repairs, $103,567; total cost to June 30, 1901, $168,567.

LAKE FREIGHTERS AWAITING RISE OF WATER AT THE LIME-KILNS, ONE OF THE SHALLOW SPOTS IN THE DETROIT RIVER.
SCENE AT THE COAL DOCK OF STANLEY B. SMITH & CO.

"The Boutwell, constructed in 1873: Original cost, $70,000; for repairs, $54,490; total cost to June 30, 1901, $124,490.

"It is plain that further expenditures on these old vessels should not be continued longer than it will take to provide new ones to supply their places. It is, therefore, recommended that new vessels be constructed to replace those above named, at a cost for each of $175,000. This will require an appropriation of $700,000."

The secretary devotes a considerable part of the report to the upbuilding of the American merchant marine. Our position on the sea is insignificant. By means of a reasonable share of the trade with the nearby ports and islands of North America, American vessels carried last year 8.2 per cent. of our exports and imports, the smallest in our history. Continuing, he says:

"Repeatedly during the past twenty years my predecessors have recommended, as the first step toward the establishment of the American merchant marine in foreign trade, legislation to create similar lines of American mail steamers. An act for that purpose was passed in 1891, but its provisions were inadequate in some particulars and in others unscientific. Accordingly I renew the recommendation made in 1898 for a remodeling and extension of the act of March 3, 1891, relating to the carrying of ocean mails by American steamships, so that it shall meet requirements which have arisen since the law went into operation. The time is opportune and the conditions propitious for such legislation. Great and continuous appropriations for warships have created plants which can build ocean steamers of the highest class. Capital is abundant, and the energies of the nation are bent toward the increase of our foreign trade and of national prestige. There is no longer any reason why we should be dependent on the auxiliary navies of European powers for our ocean mail service. The establishment of a complete American ocean mail service to Europe, Asia (including the Philippines), South America, and Australia, similar to the national mail services of Great Britain, Germany, and France to the United States, Asia, Africa, and Australia, will in itself furnish the backbone for an American system of communication by sea.

"If we are at an early day to become a maritime power, such mail lines alone will not suffice. In my report for 1898 the establishment of a system of graded bounties upon the mileage navigated by American vessels while engaged in the foreign carrying trade was recommended. Our international obligations—to mention only one conclusive reason—preclude resort to discriminating duties or export bounties. Navigation bounties are employed by France, Italy and Japan, but the relatively small results of the system in those countries throw no light on the probable results of that system in the United States. The naval program of France employs all of the ship building resources of that nation; Italy pays an import bounty on coal, and rapid as has been Japan's development, the complicated industries involved in modern ship building are as yet young in that country. The United States is the largest producer of steel and coal—a fact which alone guarantees our ultimate future as a ship building nation.

"Our vast railroad systems no longer stop operations at salt water. Through ocean steamers controlled, if not owned, by them, they transport commodities under the same management from the interior across the seas to the distributing centers of the fields of consumption in Europe and Asia. Our power to produce has grown so fast beyond our power to consume that the problem of improved transportation facilities to foreign markets is of greater importance to the inland producing states of the union than to the seaboard commercial cities. The solution of the problem may contribute not only to the general wealth of the United States, but also to its development in new directions. From the beginning of government, with brief interruptions, our legislative policy has been to develop the sufficiency of the country to meet all its own needs. We build few ships for foreign trade; it is desirable that we should build many. We have very few ships under the flag in foreign trade; it is desirable that we should have many. The obstacles are the relative cost of building ships here and in Great Britain, which in time will be overcome, and the relative pay of crews on American and on foreign ships. Navigation bounties in the United States are justifiable only by present conditions, by the certainty that they will not long be required, by the fact that they need not in any year exceed the total cost of a couple of battleships, and by the fact, conceded by our maritime rivals, that they will produce the results we desire. In legislation upon the subject it is recommended that congress shall keep in view the fact that the expedient is temporary and that prompt results are desired."

MR. CARNEGIE'S UNIVERSITY EXTENSION GIFT.

Mr. Andrew Carnegie recently gave $10,000,000 for university extension work under the direction of a commission appointed by the general government. His idea was not, as was popularly supposed, to found a new university at Washington, but to provide funds to supplement postgraduate work and to carry scientific research further than it is now carried by any university. The newspapers announced that the gift was in the shape of $10,000,000 of preferred stock of the United States Steel Corporation. This was an error. Mr. Carnegie owns little, if any, stock in the steel corporation. The gift was in bonds. There seems to have arisen some question as to the propriety of accepting the gift in its present shape—a doubt which we believe to have no solid reason back of it. If the $10,000,000 was given in money it would have to be invested in some security bearing a much lower rate of interest than the bonds which Mr. Carnegie offers. The only thing the commission could do would be to put the money in government bonds, which would net less than 3 per cent. Mr. Carnegie offers a 5 per cent. bond secured by the ships, railways, mills, furnaces, coal fields and iron ore mines of the steel corporation. What better security could one ask and where could one find another investment at once so secure and so profitable? The government had better accept the gift as it is and leave Mr. Carnegie's judgment as to the investment of it alone.

Mr. Henry M. Whitney of Boston has sold a controlling interest in the Dominion Iron & Steel Co. to Mr. James Ross of Montreal. Mr. Ross was already a very large holder of the stock.

A GREAT ENGINEERING UNDERTAKING.

While the proposed extension of the Pennsylvania railway into New York city is not a maritime subject, it is of sufficient importance as an industrial and engineering subject to merit the attention of this journal. It is without doubt one of the greatest enterprises that has ever been undertaken by a corporation. Its magnitude may be appreciated when it is known that it will traverse the solid rock at a great depth beneath the subway now under construction and will not interfere with any conduits that may hereafter be required to be built. It will cross the Hudson river 100 ft. below the river bed. The statement of President Cassett regarding the subject is as follows:

"The Pennsylvania Railroad Co. is now prepared to carry out its policy, long since adopted, of extending its railroad into New York city, therein establishing a suitable passenger terminus for the accommodation of the public. To accomplish this on a comprehensive plan the Long Island Extension Railroad Co. will withdraw its application for power to construct its terminal railroad, and in lieu of such independent construction it is now proposed to build, under the charter of the Pennsylvania-New York Extension Railroad Co., just organized, and a New Jersey railroad company, about to be organized, a thorough underground connection between the Long Island railroad and the Pennsylvania lines in New Jersey and to construct a proper and commodious joint underground terminal station in New York city for the Pennsylvania and Long Island roads.

"After years of exhaustive study the conclusion has been reached that a tunnel line, operated by electricity, is in every way the most practical, economical and the best, both for the interests of the railroad company and the city. The line as adopted will traverse the city of New York from the Hudson river to the East river and be underground throughout, and at such depth as not to interfere with future construction of the subways by the city on all its avenues, similar to the one now building along Fourth avenue. As the railroad will be wholly underground and operated electrically in the same manner as the recently constructed Orleans railway extension in Paris, it will not be objectionable in any way. There will not be any smoke, dirt or noise, and as all the surface property may be built upon, after being utilized underneath for railroad purposes, the neighborhood of the station will be improved instead of marred, as is so often the case when railroad lines are constructed on the surface or elevated."

The bed of the Hudson river is mud and clay, a soft, oozy mass, varying from 75 to 100 ft. in depth, and considered an extremely uncertain medium in which to work. Mr. Charles M. Jacobs, consulting engineer of the Long Island railroad, devised a novel plan of tunnel construction, which at once solved the difficulties, as follows: Build a bridge beneath the river bed, support it upon piers which shall rest upon the solid rock and then enclose the bridge in a steel tube to keep out the wet and dirt. This system, it is held, will insure a stable structure, and one of immense strength, as the piers and the bridge work and not the tube will bear the weight of the trains. The steel tubes, presumably one for each track, will be 18½ ft. in interior diameter and will be put together in circular sections of about 2 ft. in length, and there will be perhaps four of them beneath the Hudson river, and at least two beneath the East river. The tracks will lie some 80 to 100 ft. beneath the Hudson river bed in midstream, approaching the surface of the river bottom as the tunnels approach the shore. It is calculated that the work will be three years in construction and will cost approximately $50,000,000. The Pennsylvania station will be located in the block bounded by Thirty-first to Thirty-third streets and Seventh to Tenth avenues.

PROPOSED DEPARTMENT OF COMMERCE.

Mr. James B. Dill, the corporation lawyer who settled the Carnegie-Frick difficulties, delivered an address in Philadelphia last week upon the subject "Character and Business." He devoted his attention to the proposed department of commerce, whose head shall be a member of the federal cabinet. The gist of his remarks is contained in the following:

"This country has privately, and through official messages of governors and latest of the president of the United States, been advised of the dangers which come from within. We have been told of the perils of over-capitalization, of speculation, of blind pools, of the entrance of commerce into politics, of the combination seeking to control legislation, with the temptation to use the capital of vast combinations, publicly or privately, to influence and procure legislation. But the crisis confronts us today in that the government proposes to take under its control, through a department of commerce, the commercial forces of this country. Under the senate bill 569, the official head of the department of commerce is a secretary of commerce, who becomes a member of the cabinet. It needs no prophet to suggest that this man holds in his hands magnificent opportunities for good, or great power for evil. The control of this man would mean the control of the industrial, commercial and financial situation. Every danger which belongs properly to combinations and trusts, and every advantage to the public, or by reason of the combination and mobilization of the industries, rests in the hands of the head of that department. He will be the combiner of combinations. He will be the trustee of trusts. He will also be a trustee of the industries and finances of this country, and for the people. Will he be a trustee or a trust is a question which can only be determined and settled by the character of the man appointed. If he be a mere politician this country will face dangers compared to which the so-called dangers of trusts and combinations are but featherweights.

"More than this, the position of this country today justifies the assertion that the coming war between nations would be for social supremacy, and not for physical control. This war is today at our doors, and according as we succeed or fail this country expands or contracts, becomes rich or poor, becomes powerful or powerless. No man in the United States, not barring the president of the United States, will exercise such a potent influence over the future of the commercial life of this country as the secretary of the department of commerce.

"What are the safeguards? Political issues? Never. Legislation by itself? No. Public opinion? Alone? No. We indicate the answer in an humble illustration. When the progress of this country demanded great superstructures it was found that the most substantial of materials—granite—was not safe for those creations which climbed up, in and toward the sky. Not until a plan was conceived of first erecting a steel framework was there an answer to this proposition. So, in the present case, the only solution is in the question of personal character. But as in the case of the steel framework of the tall buildings this personal character must go from top to bottom, must unite the foundation and the capstone.

"To say that the industrials of this country are dependent upon the personal character of the leaders of the great corporations is simply to emphasize the fact that we have erected in this country tall financial and commercial structures, in which many, if not all of us, are dwellers, and whose fall would carry ruin to many, injury to more. Our commercial enterprises, our finances, and the income from our investments are dependent almost wholly upon the personal character of those in control of the great corporations."

ANNUAL REPORT OF REAR ADMIRAL M. T. ENDICOTT.

The annual report of Rear Admiral Mordecai T. Endicott, chief of the bureau of yards and docks, is just from the printer. The estimates for the next fiscal year are large and much beyond the limit supposed probable when the appropriations for the current year were made. A very considerable portion of the present estimates is made up of sums necessary for carrying on works already authorized by congress and for which contract obligations have already been entered into. Other portions are for the purpose of meeting adequately the necessities of the service at home and in the island possessions. The estimates for all the yards and stations are as follows:

Public works of improvement	$20,781,375.00
Repairs and preservation	500,000.00
Maintenance, yards and docks	600,000.00
Contingent, yards and docks	50,000.00
Civil establishment	184,204.08
	$21,526,359.08

Estimates are presented for carrying out the recommendations of the board upon care and preservation of torpedo boats, which were submitted to the department in July last and which have received its approval. The admiral says upon this point:

"The scheme includes early provisions at Boston, Narragansett bay, New York, Norfolk, Charleston, Pensacola, and Mare Island, in order that the torpedo vessels afloat and those nearing completion may be properly distributed and cared for. It is proposed to supply wet basins for the accommodation of boats in commission for active service and those in commission in reserve; also a plant for the accommodation of boats hauled out for storage or repairs. The appropriations necessary to be made at the approaching session of congress to carry out these plans aggregate $2,125,000, with an estimated ultimate cost of about $3,175,000. Such provisions as here indicated are deemed of the highest importance, and urgent, and in carrying out improvements at Norfolk and Charleston it will be practicable to further the plan at once at these points, and some at Narragansett bay; in fact, proposals are already advertised for plants initiating the works at Narragansett and Norfolk.

"The large increase in the amount of duty thrown upon the navy yards has rendered necessary the construction of many new works of improvement, and the limit of space available has been reached in a few instances with further facilities requisite without the area upon which to locate them. This is notably true of the New York, Washington and Norfolk navy yards. The bureau earnestly recommends that immediate authority be obtained from congress for the extension of these yards. If this be not done, the naval service will be seriously crippled in a few years through the inability to handle the large amount of work which must be provided for at these important points. There is a continuous advance in the price of real estate in the vicinity of these yards and as the acquirement of additional area is now exceedingly important and must be effected sooner or later, the most advantageous time from a pecuniary standpoint, as well as from others, is the present."

The construction of a steel floating dry dock for the navy yard at Portsmouth, N. H., designed to replace the present floating dry dock, is recommended. The old dock is now far gone in decay, and is safe for vessels weighing only about one-third its original capacity. The construction of the new dock is urged without delay.

A naval station at San Juan is recommended with dry dock, the total estimate for the improvements reaching $2,613,000. The need of a first-class station in the Philippines is also emphasized and Olongapo, Subic bay, suggested as the proper site. The admiral earnestly advises dredging between the sea and naval stations, saying:

"Navigation between the sea and the naval stations is a subject of vital importance. It has not always been in a satisfactory state. The draught of vessels gradually increased until some of the largest now afloat found it dangerous or impossible to go to several of the yards for repairs or supplies. The interests of commerce have cooperated with those of the naval service in several ports, and the difficulties existing have been removed or in a measure reduced. Enough remains to be done to make it a proper subject of especial comment and recommendation. It is essential that every station occupying a position of importance from a strategic standpoint should be easily and safely approached by the largest and deepest draught vessels. Proper berths in which they can be afloat at all stages of the tide are provided under the appropriation for dredging at the yards made in the naval acts, but the construction and maintenance of ample navigable channels in the rivers and harbors are duties lodged in another department, by specific appropriation for each case, and are not the subject of estimates by this bureau, except when so required by congressional enactment."

The estimates for the various navy yards are as follows: Portsmouth navy yard, $1,947,575; Charlestown navy yard, $1,570,000; New York navy yard, $3,475,000; League island navy yard, $741,300; Washington navy yard, $622,000; Norfolk navy yard, $1,511,000; Pensacola navy yard, $995,800.

The Pennsylvania Steel Co. last week gave a lease of certain mining lands in Minnesota to Dwight E. Woodbridge of Duluth. The lease provides for a minimum output of 50,000 tons and a royalty of 23 cents per ton. The property adjoins the Sharon mine near the town of Buhl.

FROM BRITISH SHIPPING CIRCLES.

A REVIEW OF VARIOUS SUBJECTS THAT ARE ATTRACTING THE ATTENTION OF SHIP BUILDERS AND SHIP OWNERS—OUR PROPOSED SHIPPING LEGISLATION, THE BOILER QUESTION, WIRELESS TELEGRAPHY, ETC.

Glasgow, Scotland.—The naval program of Secretary Long has naturally been read with a great deal of interest here, for nowhere outside the admiralty dock yards is so keen an interest taken in naval construction generally. It seems as if it would severely tax ship building resources of the United States for some time to come. The question suggested here, however, is not so much whether this extensive program, if adopted, will curtail your ability to turn out merchant vessels, as whether you have capacity to produce enough armor plate by the time the hulls are ready for it. If it be true that your producing capacity of armor is increased to 12,000 tons per annum, that is still only equal to the output of one of our principal producers. And we have now half a dozen of them. Then, with regard to the report of the United States commissioner of navigation, with its obvious bias in favor of subsidies, the question arises: How will a system of shipping subsidies fit in with a policy of reciprocity? And still more: How will it work under a system which requires the imposition of countervailing duties on all bounty-fed sugar entering the United States? What is sauce for the goose is good enough condiment for the gander. Great Britain does not grant bounties on anything—not even on shipping, as is sometimes erroneously supposed—so the matter does not affect us directly in that way. But what will be the position if subsidized American ships enter the ports of a country which grants export bounties on sugar, on which the United States imposes countervailing duties? I have not seen this question raised before, so I do not know what answer the advocates of shipping bounties in the United States may have to it, but it seems to suggest rather curious possibilities. Ship builders, here, I may say, are skeptical of Mr. Chamberlain's comparative figures of the cost of building in Britain and in the United States. It seems evident that the details are not in each case complete, or that comparison is made between purchases at different states of the market. There has been considerable movement up and down in the cost of building ships during the last two or three years, and for a considerable portion of that time the principal material was cheaper in America than in Great Britain.

The loss of Cobra (turbine ship) and the damage to others of her class has led to the appointment of a committee to inquire into the whole question of the strength of torpedo boat destroyers and the methods to be adopted to counteract any weaknesses that may be discovered. This committee will examine any destroyers which have shown signs of weakening and will carry out experimental tests and examine witnesses. They will also examine all admiralty documents as to scantlings, weights carried, distribution of weights, etc. Admiral Rawson, K. C. B., is chairman, and the other members are Prof. Biles, Mr. Archibald Denny, ship builder of Dumbarton, Mr. Deadman of the constructive department of the admiralty and Dr. John Inglis, ship builder of Glasgow. No better selections for such a committee could be made from among the great ship building establishments in the country. All the three unofficial members are Clyde men. Dr. Inglis is already a member of another important admiralty committee, that on water-tube boilers.

In the matter of water-tube boilers it is said that the admiralty committee, just named, is preparing a report on the series of tests between the Hyacinth and Minerva, and that it will be much more conclusive in its recommendations than was the interim report. The committee has, I am told, got sufficient data to make proposals, and these will be more definite than anything yet expressed. Further tests determined upon for the two ships are more with regard to engine than boiler design, for it has been found that the Hyacinth does not give an increase of speed proportioned to her higher power. Trials are to be made to show the relative friction of the two sets of machinery at various speeds of rotation, and for this purpose the propellers will be removed and brake gear applied. The tests of Babcock & Wilcox boilers are being continued in the sloop Espiegle as well as in the gun boat Sheldrake, and the results are said to be favorable. But the question of type for the new ships to be laid down is still unsettled. This is keeping back the armored cruisers of the County class, of which five are to be given out to contract, but the machinery of all of which will be built in private works. The use of a combination of cylindrical and water-tube boilers in each ship is probable, as was originally proposed in connection with the battleship Queen, now in progress of construction. The Germans favor this system, several of their vessels being fitted in such a manner that from 40 to 70 per cent. of the steam supply is from Schulz-Thornycroft boilers, and the remainder of the power from cylindrical boilers, though in later ships they have fitted water-tube boilers for all the power. The type of water-tube generator to be adopted in combination with the cylindrical boiler in the cruisers has yet to be decided, but alternative designs will be considered of small tube and large tube boilers along with the Scotch boiler.

It is probable that at least two of the three battleships about to be ordered will be fitted with Babcock & Wilcox boilers, as in the case of the Queen, but one at least will doubtless have a combination of Babcock & Wilcox with the cylindrical, as in the case of the United States cruiser Chicago. This combination will involve differences in steam pressure, but the cylindrical boilers will be useful for low-power steaming, which represents the pace for the larger part of the work of a warship, while the water-tube boilers will be available for securing rapid acceleration in pressure, power and speed in case of need. The lower pressure of the cylindrical boiler will serve also for the simple and compound auxiliary engines. The use of express boilers in the cruisers should help to keep weights down, as they are lighter than the large-tube boilers. The Italian navy has also appointed a special committee or board to make trials with various systems of boilers. The Belleville boiler is being fitted in the armored cruiser Giuseppe Garibaldi and the Niclausse boilers in the sister ship Varese. These are vessels of 344 ft. in length, 7,400 tons displacement, with engines of 14,000 I.H.P. to give a speed of 20 knots.

What must be regarded as the latest development in maritime affairs is the extension of the use of the Marconi system of wireless telegraphy. It is causing a revolution in marine signaling. The invention is already being employed for communication between passing ships, and between vessels properly equipped and certain signal stations on shore. The Kaiser Wilhelm was the first steamer to be actually fitted with the apparatus. The Beaver liner Lake Champlain was next, and this year the Cunard steamer Lucania was fitted. Several other vessels of the Cunard company, including the Campania, followed suit, and a French liner has just had the instruments installed. Signal stations have been established on both sides of the Atlantic and are being largely taken advantage of. An arrangement has just been entered into that Lloyd's signal stations are now to be equipped with the Marconi system. All of them may not be available for the purpose, but, wherever a center for commercial wireless telegraphy is advisable, Lloyd's establishments at these points are to be equipped with the Marconi apparatus, and if no station at present exists within twenty miles of a suitable place, a new station will be erected. It follows that all the liners will now have to adopt the system.

It is interesting to note the new departure in marine signaling per Marconi at this time, because on Jan. 1 next the new international code of signals will come into use. The old code ceases on Dec. 31. The points in which the new code, which took thirteen years to prepare, differs from the old are numerous. Flags are now introduced to represent all the twenty-six letters of the alphabet; many of the more important signals which had in the old code to be made by three-flag hoists, will now be made by two-flag hoists; all the four-flag hoists in the old code will in future be made by two or three-flag hoists; and a great number of new signals made by hoists of not more than three flags have been introduced. Signaling will also be done by means of balls, cones and drums, as well as by flashes of light or blasts of sound on the Morse code. The message "You are standing into danger," which under the old order of things could only be given by means of flags in daylight, can now be flashed at night by means of the Morse alphabet. And that is no small gain.

The Clyde has not given birth to a very large number of destroyers but hopes to produce a good many more in the future. Therefore, builders here note with interest that the admiralty has placed an order for four first-class torpedo boats with Messrs. Thornycroft & Co. of London. These boats are to be exactly similar to four already launched under the naval program of last year and the preceding year. These vessels are to be 160 ft. long, 17 ft. beam, with a draught of 8 ft. 6 in. and a displacement of 178 tons. They will be fitted with Thornycroft boilers, and with twin engines to give a speed of 25 knots. They will differ from all former craft of the type in respect of their size, which is much greater than has hitherto been adopted, and which will enable them to carry a load of 42 tons when running at full speed. Three of the boats already finished have been tried, and they developed 2,876 I.H.P. when the engines were making 385 revolutions, achieving a speed of 25.35 knots with a coal consumption of 2.009 lbs. per unit of power per hour.

Scotch ship builders are naturally much interested in the report that the failure of the French cruiser Jeanne d'Arc to attain the stipulated 23 knots is due to defects in the small-tube boilers with which she is fitted. They are of the Temple-Guyot type, and a departmental committee recommended that certain modifications be made which involved a material reduction in the heating surface. The speed of 23 knots could not, therefore, be attained. It was the construction of this vessel which stimulated the demand for high speed in cruisers in combination with side armor. The Jeanne d'Arc was laid down five years ago, and with side armor of from 6 in. to 3 in. of Harveyed steel, and a designed speed of 23 knots, was held up as superior to the Cressy class of similar dimensions, which were only of 21 knots. The Jeanne d'Arc will certainly not excel now in speed.

At a meeting of our Institution of Engineers and Ship Builders, this week, Mr. William Brown of the firm of W. Simons & Co., ship builders, read a paper on "Dredging and Dredging Plant," which is the specialty of this firm. The subject is of the greatest moment to most civil engineers and contractors, and to all river conservators, harbor and dock authorities. Mr. Brown says that experience has shown that the cost in working expenses of transport per ton mile is cheaper in large than in small vessels. The resultant factor of this experience is shown in that steamers of from 7,000 to 10,000 tons, accounted leviathans a few years age, are being dwarfed and relegated to the second class by such craft as the Medic, Lucania, Cymric, Oceanic and Celtic, with their tonnage ranging from 11,850 to 20,000 tons gross. The draught of the last-named vessel is 33 ft. It seems reasonable, therefore, to anticipate that ship owners will continue to order the larger steamers until they reach the limit of dimensions, or until we reach a limit of draught in the trading ports. It should be said that British harbor boards and river conservancies, with one or two possible exceptions, are fully alive to their responsibilities. The Mersey docks board has already resolved upon a minimum depth of 30 ft., irrespective of tide, in all docks and entrance channels, the Tyne improvement commissioners are moving in the same direction, and other responsible bodies will follow suit. In America and on the continent various authorities are now providing for modern ships. By dredging in the East river channel, the United States government is operating to greatly increase the depths at New York. When this work is completed it will give, we are told, a straight channel 2,000 ft. in width, with a depth of 40 ft. at low water. Hamburg, the largest port in Germany, has repeatedly been enlarged, and as the Elbe does not afford sufficient depth of water for the modern enormous vessels, Hamburg has made Cuxhaven into an outer port for ships of any draught. The increasing accumulation of sand in the Weser below Bremen forced that city to arrange an outer port in Bremerhaven at the mouth of the Geste. Other three important ports, namely, Rotterdam, Amsterdam and Antwerp have not been lax in their efforts to keep abreast of the changed conditions. At Durban, Lord Roberts spoke of the splendid services rendered by the port during the South African war. That Durban was able to receive and deal so expeditiously with such a large body of men and munitions of war was owing almost entirely to the extensive dredging operations which have been carried on there in recent years. In support of that statement Mr. Brown quoted from a letter of the late Right Hon. Harry Escombe, in which it was stated that the Octopus was set to work in January, 1896, and had only had help from the Walrus for a few days in 1897. In 1894 the depth was 11 ft. 11 in.; in 1895, 12 ft. 1 in.; in 1896, 15 ft. 11 in.; and in 1897 17 ft. 3 in. An average depth of more than 20 ft. at low water of spring tides had been maintained for three months since October, 1900. This steady improvement in depth, extending over a period of two years, appeared to show that the Octopus was equal to the work, and that she could quickly undo the ill-effects of bad weather.

Both the vessels named by Mr. Escombe were sand-pump hopper-dredgers, and were constructed by W. Simons & Co., to the order of the Natal government to work on the very exposed bar at Durban. It could with equal truth be ascribed to dredging operations, constantly carried on, that the British government was able to land another large contingent of the South African field force at East London. As to home ports, the depth on the Mersey bar at the shallowest part in 1890 was 11 ft. and it was only on flood tide that vessels of any great draught could make the port, the range of tide being so much as 31 ft. on spring tides. To obtain the minimum depth of 30 ft., irrespective of tide, the depth on the bar had to be increased by 19 ft. In August of last year there was a channel across the bar 1,500 ft. in width, with a depth of 27 ft. at low water of spring tides at the shallowest part, the average depth being 28 ft. As an experiment, and before entering upon any extensive undertaking of suction-pump dredging, the Mersey board decided to fit sand-pumping apparatus to their hopper barges Nos. 5 and 7, which barges had been constructed by Mr. Brown's firm in 1877. The contract conditions for both vessels stipulated that they should be capable of loading the 500-ton hoppers in one hour. In each case this was accomplished, and it was found that under favorable conditions they could load themselves in from twenty to twenty-five minutes. The best percentage of sand raised by these dredgers was 45. It was the success attending the operations of these experimental dredgers which encouraged the Mersey board to face in a wholesale manner the improvement of the bar depths by the employment of suction pump dredgers. The total quantity of sand removed from the Mersey bar and channels, since sand-pumping was begun in 1890 to Nov. 24, 1900, was 58,930,940 tons, and all, I believe, by Clyde-built dredgers.

The Merion has just been successfully launched from the Clydebank yard of Messrs. Wm. Brown & Co., Ltd., for the International Navigation Co. The Merion is a sister ship of the Haverford, for the same company, which I described in previous letters.

It is reported that Messrs. Wm. Brown & Co. have contracted to build for the Cunard company another "intermediate" steamer of the Savonia and Ivernia type of about 11,000 tons gross and with cargo capacity for about 10,000 tons. In some of your exchanges you may some across a story to the effect that an American syndicate, with unlimited capital, is negotiating to buy up all the ship yards on the Clyde with the object of working them all under one combine. The author of the paragraph omitted to add Artemus Ward's note, viz: "This is a goak."

PROGRESS OF NAVAL CONSTRUCTION.

The monthly summary of construction issued by the navy department shows a fair degree of progress. The submarine boats at Lewis Nixon's Crescent Ship Yard, Elizabethport, N. J., are making the greatest progress and will undoubtedly be ready for service in a few months. Following is the summary:

Name.	Building at	Degree of completion, Per cent. Nov. 1.	Dec. 1.
BATTLESHIPS.			
Maine	Wm. Cramp & Sons	70	74
Missouri	Newport News Co.	48	51
Ohio	Union Iron Works	43	43
Virginia	Newport News Co.	0	0
Nebraska	Moran Bros. Co.	0	0
Georgia	Bath Iron Works	2	4
New Jersey	Fore River S. & E. Co.	2	4
Rhode Island	Fore River S. & E. Co.	2	4
ARMORED CRUISERS.			
Pennsylvania	Wm. Cramp & Sons	6	8
West Virginia	Newport News Co.	2	5
California	Union Iron Works	0	0
Colorado	Wm. Cramp & Sons	9	12
Maryland	Newport News Co.	2	4
South Dakota	Union Iron Works	0	0
SHEATHED PROTECTED CRUISERS.			
Denver	Neafie & Levy	58	64
Des Moines	Fore River S. & E. Co.	57	59
Chattanooga	Lewis Nixon	48	50
Galveston	Wm. R. Trigg Co.	43	47
Tacoma	Union Iron Works	20	20
Cleveland	Bath Iron Works	68	70
St. Louis	Neafie & Levy	0	0
Milwaukee	Union Iron Works	0	0
Charleston	Newport News Co.	0	0
MONITORS.			
Arkansas	Newport News Co.	75	82
Nevada	Bath Iron Works	91	91
Florida	Lewis Nixon	74	77
Wyoming	Union Iron Works	75	75
TORPEDO BOAT DESTROYERS.			
Bainbridge	Neafie & Levy	99	99
Barry	Neafie & Levy	92	95
Chauncey	Neafie & Levy	96	98
Dale	Wm. R. Trigg Co.	97	97
Decatur	Wm. R. Trigg Co.	98	98
Hopkins	Harlan & Hollingsworth	76	77
Hull	Harlan & Hollingsworth	75	75
Lawrence	Fore River S. & E. Co.	99	99
MacDonough	Fore River S. & E. Co.	98	98
Paul Jones	Union Iron Works	85	85
Perry	Union Iron Works	89	89
Preble	Union Iron Works	87	87
Stewart	Gas Engine & Power Co.	63	63
Truxton	Maryland Steel Co.	78	80
Whipple	Maryland Steel Co.	77	78
Worden	Maryland Steel Co.	76	78
TORPEDO BOATS.			
Stringham	Harlan & Hollingsworth	98	98
Goldsborough	Wolff & Zwicker	97	97
Blakely	Geo. Lawley & Son	98	98
DeLong	Geo. Lawley & Son	98	98
Nicholson	Lewis Nixon	97	97
O'Brien	Lewis Nixon	98	98
Thornton	Wm. R. Trigg Co.	97	97
Tingey	Columbian Iron Works	70	74
Wilkes	Gas Engine & Power Co.	90	93
SUBMARINE TORPEDO BOATS.			
Plunger	Lewis Nixon	45	50
Adder	Lewis Nixon	92	95
Grampus	Union Iron Works	51	51
Moccasin	Lewis Nixon	85	90
Pike	Union Iron Works	50	50
Porpoise	Lewis Nixon	80	85
Shark	Lewis Nixon	74	80

AROUND THE GREAT LAKES.

Thirty-six cases are contained in the admiralty docket for the January term of the United States district court at Detroit.

Mr. Francis H. Clergue of Sault Ste. Marie says there is no truth whatever in reports of a ship yard to be established in connection with other industrial enterprises at the Sault.

The Milwaukee Nautical school, under the direction of Mr. Clarence E. Long, will be opened on Dec. 15 and will continue until April 15. Mr. Long teaches the science of navigation in all its branches. His address is 140-142 Reed street, Milwaukee, Wis.

The season's shortage in grain shipments, due to failure in the corn crop, is reflected in the falling off of business at Buffalo compared with last year. Exact figures covering Buffalo's receipts of grain of all kinds have not as yet been compiled, but they are in round numbers 132,000,000 bushels compared with 158,000,000 bushels in 1900, or a decrease of 26,000,000 bushels.

During the Detroit marine postal season of 1901, which closed Saturday night, there were delivered to vessels passing up and down the Detroit river 400,000 pieces of mail and money orders to the amount of $10,547.94 were issued. The vessel passages numbered 20,527. Although the season was twenty days shorter than that of 1900, there was a considerable increase in business.

The first of the steel steamers building by the American company for the United States Transportation Co. will be launched at South Chicago early next month and named A. G. Brower. The ships of this company are to be managed by Capt. W. W. Brown of Cleveland, whose associates are capitalists of New York state and the Puget sound district. Mr. Brower is a resident of Utica, N. Y.

E. N. Saunders is the name selected for the third of five steel steamers which the American Ship Building Co. is building for J. C. Gilchrist and others of Cleveland, and which will be launched in a few weeks. Mr. Saunders, for whom the vessel is named, has been the leading spirit in the Northwestern Fuel Co. for a long time past. The Frank W. Hart, second of this latest Gilchrist fleet of new ships, was launched at the Lorain yard Saturday.

Directors of the American Ship Building Co. met in Cleveland Wednesday and declared the usual dividend of 1¾ per cent. on the preferred stock (it is to be paid Jan. 15), but took no action regarding a dividend on the common stock. Although this company has funds sufficient to begin the payment of dividends on common stock, it is not probable now that anything will be done on this score until the end of the company year, which is June next.

NEW ANCHOR LINE SHIPS.

Reports regarding three or four ships to be built for the Erie & Western Transportation Co. (Anchor line) are somewhat wide of the mark. Mr. Frank J. Firth, president of the company, says in answer to a request for information regarding plans for new vessels:

"While we have not as yet contracted for any new steamers, it is our present purpose to contract during the winter for one new freight and passenger steamer for our Lake Superior service, which will be novel, and we hope very convenient, in certain of its passenger appointments. The steamer will have say 100 state rooms, somewhat after the ocean steamer type, having berth accommodation for two passengers and a lounge that may be used as a bed for a third passenger when needed. The freight capacity will be about 3,500 tons of package freight. We also have it in contemplation to contract for a new freight steamer for our Lake Michigan service, of about 5,000 tons capacity. Among our winter improvements we expect to erect a new freight house on the Detroit harbor property that we purchased about a year ago."

TO CATCH FISH BY ELECTRIC LIGHT.

Mr. W. E. Cole has just completed at Norfolk, Va., a vessel specially designed and equipped for catching fish by the use of electric light. The vessel is named Atlanta (Mr. Cole's home is Atlanta, Ga.) and is 78 ft. long, of light draught and large beam for her length. The light draught will enable the vessel to enter shallow rivers and other places along the Atlantic seaboard that are not frequented by the regular fishing craft; places where Mr. Cole's plan of fishing with electric light may be applied to special advantage. An arc lamp of high power, specially constructed by the General Electric Co., is carried over the bow of the vessel and the fish, attracted by the light, are caught in nets attached to the vessel. The light is not submerged. After trials during a couple of years past, Mr. Cole is so confident of success with his scheme that he has expended quite a sum of money building and equipping the kind of vessel best suited to the work. A double gas engine of 32 H.P. for driving the vessel and operating the light was furnished by the Chase Machine Co. of Cleveland. Tanks are arranged for a 48-hour run.

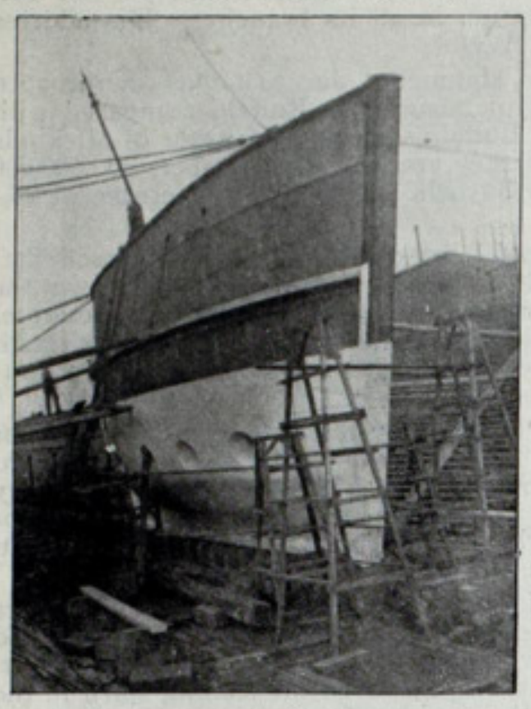
The large concerns at Duluth, Milwaukee and other lake ports that receive coal by water and distribute it throughout the northwest are gradually being bought up by the combinations. Only a short time ago it was announced that the Fairmount Coal Co. (large West Virginia mining interest) had purchased two-thirds of the stock of Northwestern Fuel Co., and now comes the report that the Pittsburg Coal Co. has bought three-quarters of the stock of the C. Reis Coal Co., operating at Ashland, Escanaba, Manitowoc and Sheboygan. The Pittsburg Coal Co. has also purchased control of the business of Whitnall & Rademaker of Milwaukee. This latter concern does not handle a very large amount of soft coal but they are large dealers in hard coal. Thus the business of chartering ships for lake coal and looking after the distribution of it is gradually falling into a few hands. The Milwaukee & Western Fuel Co. (Uhrig interest) is now about the only large distributing concern in the upper lake region that is not controlled by the producing combinations.

Henry S. Pickands, the senior member of the firm of Pickands, Brown & Co., Chicago, died at his home in that city Dec. 17. He was well known in the Lake Superior mining region and has been for years one of the foremost figures in the Chicago iron trade.

NEW DRY DOCK AT BALTIMORE.

A DESCRIPTION, PREPARED BY MR. JAMES RITCHIE, DESIGNER OF THE DRY DOCK OF THE WILLIAM SKINNER & SONS SHIP BUILDING & DRY DOCK CO.

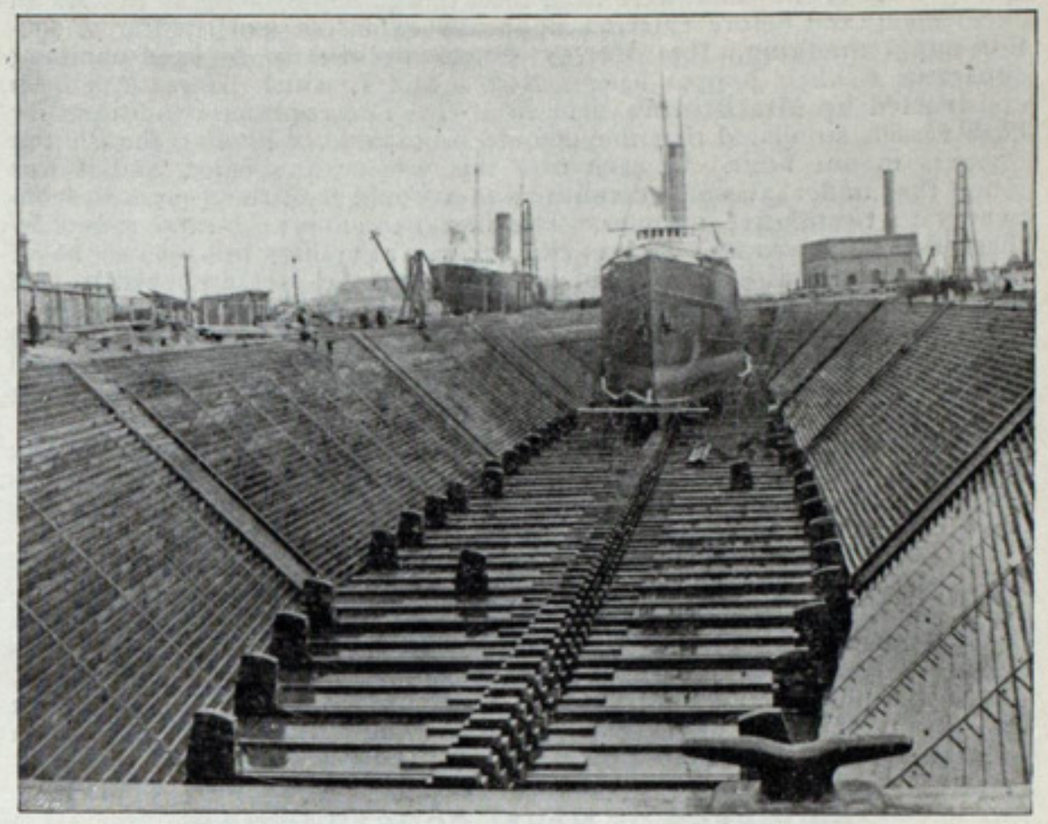
The new dry dock of the William Skinner & Sons Ship Building & Dry Dock Co., Baltimore, Md., was recently opened for public service with imposing ceremony. A number of distinguished engineers and officials from Washington attended the dedication. The dock was designed by Mr. James Ritchie of Cleveland. The original plans were for a timber dry dock, but after they had been prepared it was thought better to construct the dock of concrete and masonry, and further plans were accordingly made. Proposals were received for a concrete dock, but the company decided to construct the dock of timber with a concrete and masonry entrance. The plans and specifications were modified to conform to this decision and on June 29, 1899, a contract was awarded to the Delaware Construction Co. of Wilmington, Del., for the construction of the dock and approaches. With the exception of the new dry dock at Newport News, it is the largest on the Atlantic coast. The following description of the dock was prepared by Mr. Ritchie for the Civil Engineers' Club of Cleveland and for the Journal of the Association of Engineering Societies:



THE GATE OF THE DRY DOCK.

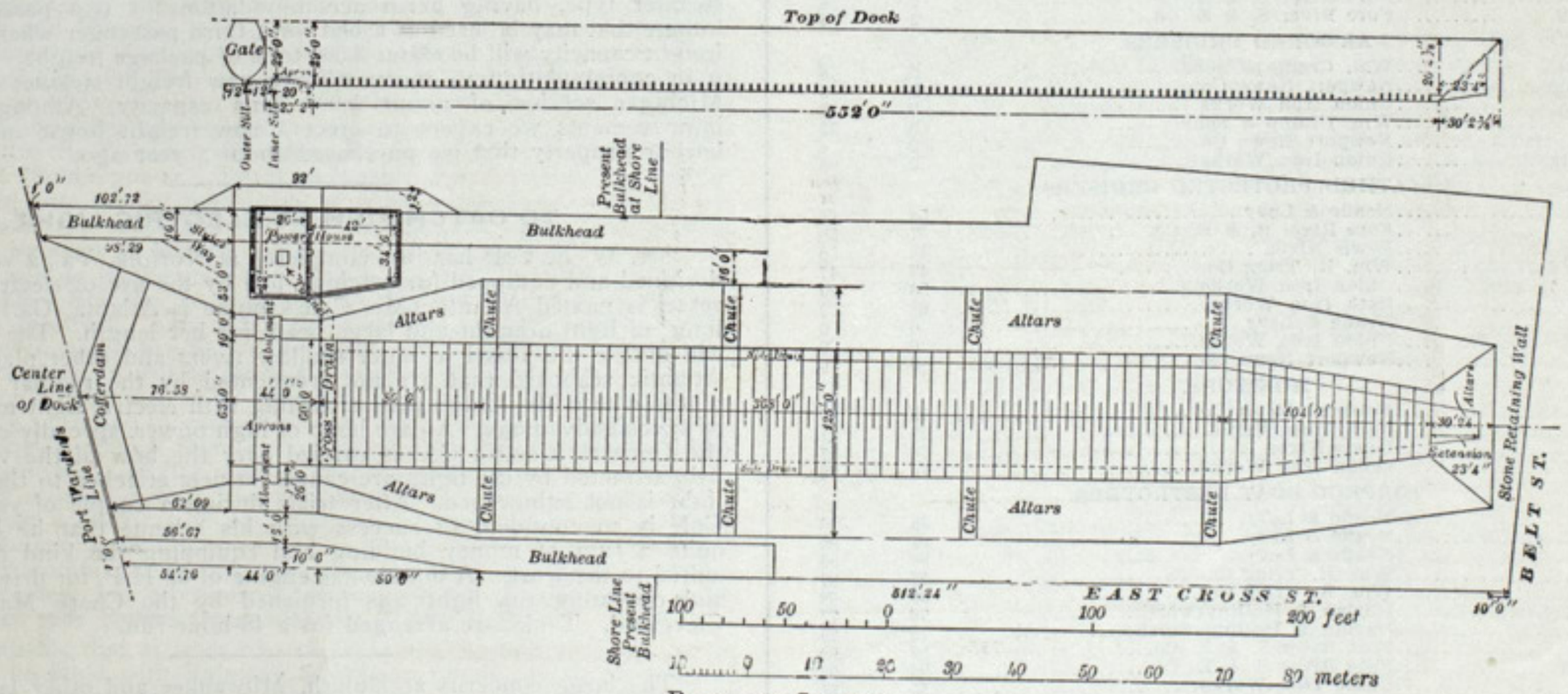
"The principal dimensions of the dock are: Length over all, 626 ft.; length on keel blocks, 576 ft.; distance from inner face of gate, when placed in outer grooves, to head of dock on keel blocks, 600 ft.; width of entrance at bottom in clear, 60 ft. 2⅝ in.; width of entrance at top in clear, 80 ft. 2⅝ in.; width of basin on top, 125 ft.; depth of water on inner sill at low tide, 22½ ft. A pocket has been built at the head of the dock which will allow the bow of a vessel to extend 23 ft. 4 in. beyond the original head of the dock, that will permit of docking a vessel 600 ft. long over all. The location of the dock is such that it could not be wholly constructed within the limits of the existing shore line, as will be seen by examining the plan. In fact, the concrete and masonry of the entrance were constructed at a distance of about 208 ft. from the shore, but still inside of the established harbor lines. This entrance had to be excavated to a depth of 36 ft. below low water, and covered a space of 44 by 164 ft., requiring the above depth over the entire space. To accomplish this work and to provide a permanent protection for the same after the completion of the dock, a bulkhead was constructed of 10x12-in. tongued and grooved sheet piling, from 34 to 48 ft. in length, driven in two rows 16 ft. apart, braced by guide piles, 12x12-in. timbers and 1¾-in. iron rods every 10 ft., the inside walls of these bulkheads being from 132 to 145 ft. apart. On the south side of the dock, opposite the south abutment, a third row of sheet piling was driven outside of the bulkhead, and between the two outer rows the concrete wall of the power house was constructed. The entire area of the dock was then dredged to the depth required for the dock bottom, and the entrance closed by a cofferdam of the same form as the protection bulkheads. The 16-ft. space between the walls of the bulkheads and cofferdam was filled with clay, and the water in the dredged portion was pumped out. During the process of pumping out, braces were put in from side to side of the basin, supporting them on temporary piling, which effectually prevented the bulkheads from yielding to the outside pressure. Also, there were two rows of 10x12-in. tongued and grooved sheet piling driven across the dock, one at each end of the proposed excavation for the entrance masonry, and these two rows were braced together by heavy timbers. The end cofferdam was also braced with timbers to the outer of these cross-rows, and the inner row was braced to a line of piling in the inner basin, afterward used as a part of the supports for the dock floor.

"After the water was pumped out the bottom of the entrance excavation was finished to the required depth, and the work of concreting was commenced. The foundation soil was a hard white clay, of such firmness that the sheet piling had broomed up on the ends as if they had struck rock. Above this clay there was fine white sand, of variable depth and occurring in pockets, and this material caused considerable trouble by reason of its water-bearing character. Above the sand was a stratum of red gravel, very hard and compact, in which some of the sheet piles had brought up, so that in some cases it was necessary to excavate below the ends of the piling to secure desired depth. By careful handling of the concreting, we overcame the difficulties caused by the water, and concreted the whole area up to the level of the under side of the apron masonry without serious trouble. In order to prevent leakage from the outside when the dock should be in service we excavated a trench 3 ft. deep in the white clay clear across the entrance, and filled the same with concrete, to act as a cut-off wall.



The New Dry Dock of the William Skinner & Sons Ship Building & Dry Dock Co., Baltimore, Md., Docking Its First Vessel, the Nantucket.

"The south abutment was designed to contain the pumping plant, and a tunnel to convey the water from the dock to the pumps was formed in the concrete. The tunnel was 6 ft. wide and 6 ft. high, and its roof was formed of concrete 10½ ft. thick, the upper surface of which formed the floor of the engine room. Iron beams 12 in. deep were set on the walls of the tunnel and imbedded in the roof, and the suction pipes of the pumps and foundation bolts of the engines were also built into the concrete. The suction pipes had flanges cast on them at intervals, projecting into the concrete, to serve as supports and to cut off seepage of water. At the distance of 3 ft. below the floor and the same distance back from the face of the engine room walls a layer of Portland cement mortar was put in for the purpose of overcoming the porous nature of concrete and preventing leakage. As the walls were built up this layer of mortar, which was 3 in. thick, was carried with them to a point above high water mark, the floor of engine room being 16 ft. below low water line. All of the concrete used on this work is made of one part of American Portland cement, two parts of sand and five parts of broken stone, and this mixture we found very satisfactory. The cement used was what is known as 'Dragon,' made in the Lehigh valley, and each lot of 100 barrels was tested for tensile strength after seven and after twenty-eight days' setting. Hot and cold pat tests were also made, both in air and water, and the results were such as to show a good quality of cement. We had considerable trouble in securing a good quality of sand, but after repeated rejections a very fair



PLAN AND SECTION

material was obtained. The broken stone was generally very good, being clean, uniform in size and of a good quality of granite.

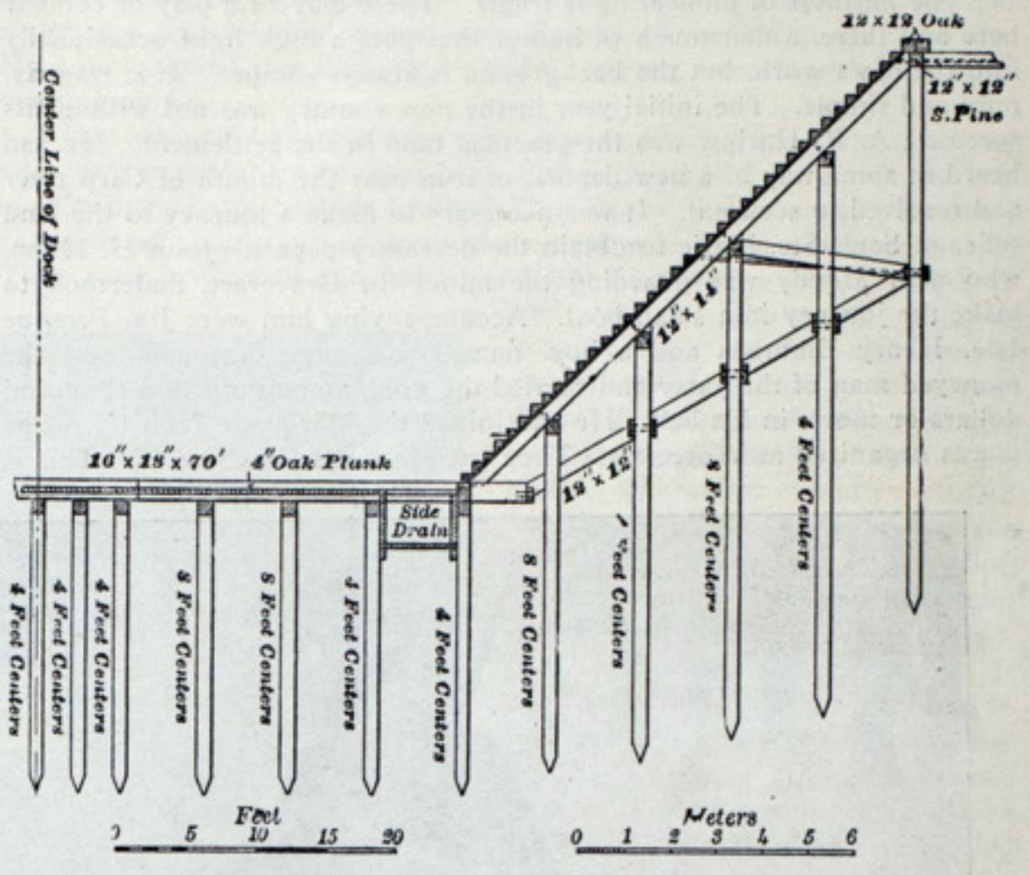
"The facing of the abutments and the floor of the aprons was of Port Deposit granite, and is a very fine piece of work. The sill stones are 6 ft. thick, and weigh from 14 to 17 tons each. They rest upon the concrete base, which is from 8 to 10 ft. in thickness. The apron floor is of granite, from 2 to 3 ft. in thickness, according to location. The abutments are faced with granite in courses of 2 ft. in thickness, the stretchers being not less than 6 by 4 ft. and the headers 3 by 6 ft., which gives the walls a very massive appearance. All the stones are doweled together on the beds, and the outer sills are tied to the inner sills by steel bands bedded in the concrete base.

"As soon as the concreting reached the floor level of the engine room, which is 10 ft. above the floor of the dock, the Morris Machine Co., contractors for the pumps and engines, commenced to set the same in place and to put in the discharge pipes which go through the outer walls, and had to be concreted into place. There are three main pumps, each capable of discharging 35,000 gallons of water per minute, and one drainage pump, all being of the centrifugal type. The latter is for the purpose of taking care of the leakage of dock when same is in use. Each pump is operated by a vertical single high-pressure steam engine, and is furnished with gate valves in both the discharge and suction pipes. The pumps will discharge wholly below the level of the water in the harbor, and can thus be primed at any time by opening the valves in the discharge pipes. The foundations of the boiler room consist of a bed of concrete 7 ft. thick, supported upon a grillage floor which rests on piling. The concrete extends down below low water line, and in it there is formed an air duct for the forced draft. The boiler plant consists of a battery of three Heine water-tube boilers of 350 H.P. each, or a total of 1050 H.P. In addition to this battery there is an auxiliary tubular boiler for furnishing steam for the drainage pump and the pumps in the gate, as well as the engine that drives the air fan. As soon as the pumps and boilers were in place the contractors erected the power house superstructure, which is a brick building with an iron roof, and which will have a platform 4 ft. wide around the engine room, with stairs leading down to the engine platforms.

"The dry dock basin is constructed of piling and timber, as shown on the plans and cross section. There are thirteen longitudinal rows of piles, capped with 12x12-in. timbers, drift bolted to the piles. Upon these caps are placed the transverse sills, securely bolted to the caps. These consist of 16x18-in. Oregon fir timbers, placed 4 ft. apart on centers. Every alternate timber is 70 ft. long, the intermediates being 14 ft. long. On these timbers are placed the keel blocks every 4 ft., and the slide or bilge blocks every 8 ft., for supporting the vessels when in dock. The floor is of oak plank 4 in. thick, spiked to supports which rest upon and are bolted to the longitudinal caps. The floor slopes from the center of dock to the sides, and at each side there is a longitudinal drain which empties into a cross-drain leading to the tunnel under the engine room. The slopes are formed of five rows of piles on each side of dock, capped with 12x12-in. timbers longitudinally of dock, and braced by 12x12-in. braces from ends of transverse timbers to waling pieces bolted to the rows of piles. The slope timbers are 12x14 in. every 8 ft., resting on and bolted to the caps and framed into the upper side of the main cross-timbers of floor. Another slope timber, 8x14 in., is placed midway between the main slope timbers, and framed into a filler which runs between the main cross-timbers of floor. There are four chutes on each side of the dock, extending from top to bottom of the slopes, for the delivery of material into the bottom. These are 8 ft. wide, and are made of 6-in. oak plank laid on the slope timbers, and having a combing on each side consisting of an 8x14-in. timber. The remainder of the side slopes are covered by altars or steps, having a rise and tread of 10 in., the top being finished by an oak coping made of two pieces of 12x12-in. edge, bolted together; all the altars being spiked to the slope timbers, and the coping being drift bolted to the upper cap. The head of the dock has an extension, previously mentioned, made by setting in 10x12-in. sheet piling and bolting same to heavy timbers framed into the caps and floor timbers, and braced in every possible manner.

"As the east line of the street was only 16 ft. from the top of the dock at its head and 12 ft. above same, it was thought best to concrete the slopes at the head of the dock and also the sides for a distance of about 60 ft. from the head end, to prevent any possibility of the settlement of the outside earth. Also at the end of the dock on the north side, just inside of the entrance masonry, where the top of slope approached very nearly to the inside wall of the protection bulkhead, we placed a solid wall of concrete. In all other parts of the slope the earth excavated from the bottom was filled in back of the altars as they were placed in position.

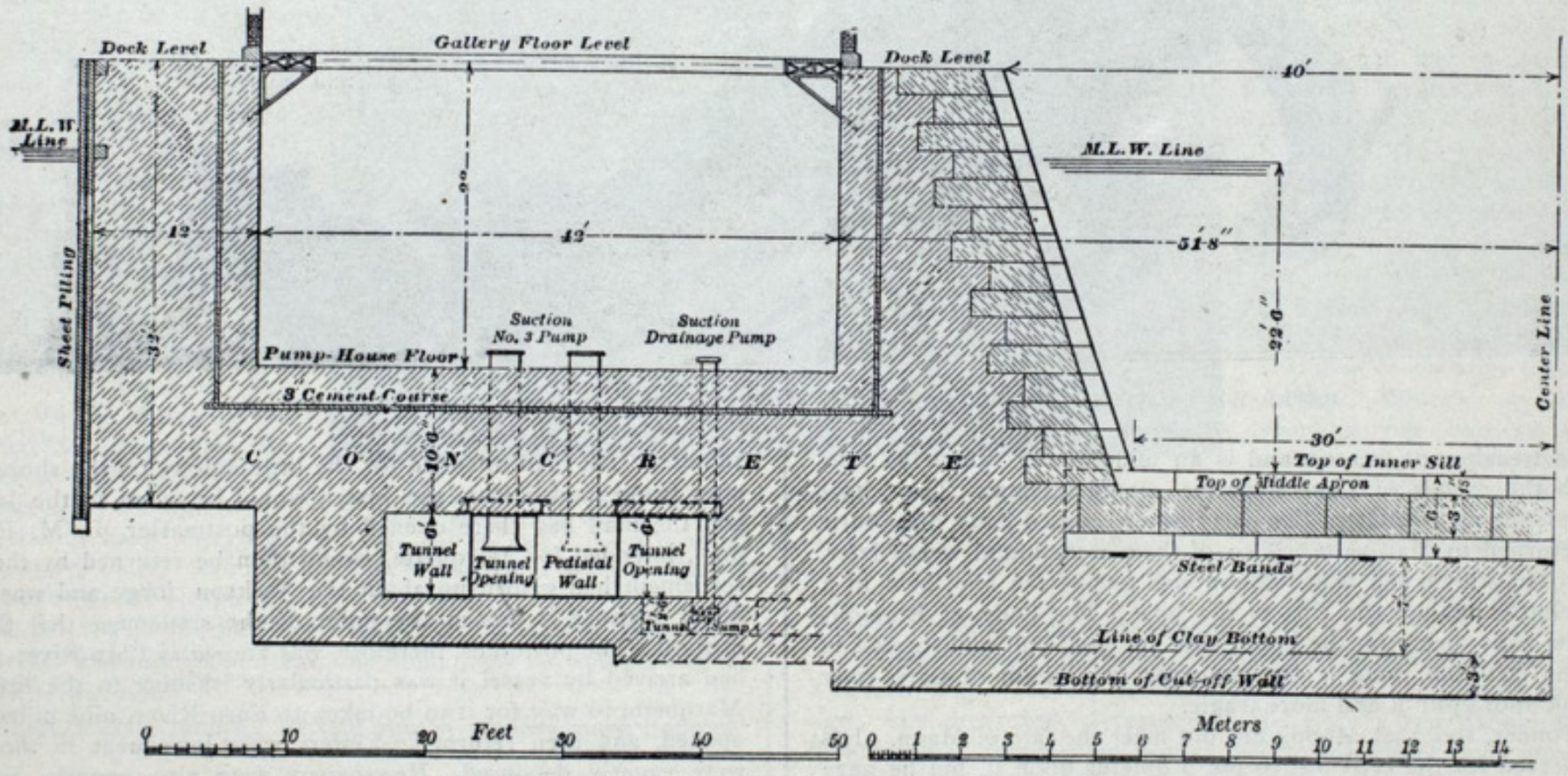
"On Sept. 25, 1901, the contractors finished cleaning up the dock and removed all temporary pumps and engines from the same, allowing the water to gradually flow in until the dock was filled, and then commenced to remove the end of cofferdam and dredge out the entrance. The gate is a steel caisson, made to set in the grooves of the masonry entrance, and



HALF CROSS-SECTION OF DOCK MIDSHIPS.

to be sunk into position by filling its compartments with water. It is provided with six Ludlow gate valves for letting water into the dock, each valve being 36 in. in diameter, and with valves for filling and emptying the caisson. There is also an engine and pump for emptying the caisson, they being placed on the main deck. Steam will be furnished through hose connections from the auxiliary boiler in the power house. A retaining wall of rubble masonry, 158 ft. long, has been built to protect the street at the head end of the dock, giving a drive 12 ft. wide around the head of the dock. The side street is protected by the sheet pile bulkhead driven along the street line at the commencement of the work. On each side of the dock, and extending its entire length, is a water pipe, with hose connections between every chute, for use in washing out the dock. This pipe is connected to the supply pipe from the city mains, and also to the pumps in the power house, so that in any case a full supply of water for washing out or for fire protection can be furnished.

"The keel blocks are placed at intervals of 4 ft. on the center line of dock. They are 3½ ft. high, being made of three pieces of 12x16-in. and one piece of 6x16-in. oak, bolted to the cross-timbers of floor. The slide or bilge blocks are placed every 8 ft. and are arranged to be adjusted to the shape of the vessel, both by hinging the upper block and by sliding the entire block on the floor timber. Iron dogs, working in a rack on the floor timber, hold the blocks in place, and the dogs can be released by a pull of the chains used for moving the blocks back. The work of construction was under the immediate charge of Mr. C. P. Ruple, resident engineer, who had a force of assistants on the work at all times, and the successful completion of the work without accident is largely due to their constant presence and care."



HALF CROSS-SECTION THROUGH ENTRANCE AND POWER HOUSE

The Hon. Peter White.

A Biographical Sketch of the Lake Superior Iron Region.

BY RALPH D. WILLIAMS.

PART II.

The business of pioneering is tragic. There may be a play of comedy here and there, a deft touch of humor that puts a high light occasionally into the day's work, but the background is always somber. It is tragedy, pure and simple. The initial year in the new country was not without its sorrow. A. R. Harlow was the practical man in the settlement. He had heard in some way of a new deposit of iron near the mouth of Carp river and resolved to secure it. It was necessary to make a journey to the land office at Sault Ste. Marie to obtain the necessary papers. John H. Mann, who with Moody was guarding the mines for Graveraet, undertook to make the journey in a small boat. Accompanying him were Jim Presque Isle, Henry Emmons and a boy named Kellogg. Emmons was the moneyed man of the party and carried the gold, amounting to a thousand dollars or more, in his belt. He had joined the Marquette Iron Co. when it was organized at Worcester. They left Marquette on Nov. 27. This is

PETER WHITE WITH HIS DOGS AND SLEDS CARRYING THE MAILS IN THE WINTER OF 1850.

well into the treacherous season and is an undertaking which no one, familiar with the moods of Lake Superior, would attempt. Their boat was little more than a rowboat. The party never reached Sault Ste. Marie and never returned to Marquette. Two of them were found weeks later, dead, and frozen stiff in the boat. Mann was one of the two, held in a pitiless ice clutch, against the ribs of the boat. The body of Emmons was found the next spring on the beach with the gold still undisturbed in his belt. The fact that there is no iron near the mouth of Carp river makes the tale more pitiful and more tragic.

It is a wonder, too, that Moody did not meet the fate of Mann. His life was preserved for the civil war to put a quietus upon it, but he gave the peninsula plenty of chances to take it. Graveraet, as related, had brought a number of horses from Chicago, depending upon the vessels to bring the hay and grain for the long winter's feed later. The schooners Swallow and Siscowit, with their cargoes of grain, were unable to make Marquette, owing to a storm, and ran to L'Anse, where they laid up for the winter. It was absolutely necessary to get this grain to keep the horses from starving, and Capt. Moody, who had a heart of oak, started after it. He went upon snow shoes to L'Anse, accompanied by James Broadbent, an old salt-water sailor. Upon their arrival there they found the vessels stripped, and, what was worse, frozen in the ice. It was a disheartening task, but Moody was equal to it. He and Broadbent began to refit the Siscowit. Her captain, old Jim Bendry of L'Anse, later of Baraga, finding that he could not physically prevent them from doing so, contented himself by firing upon them as picturesque a stream of profanity as ever emanated from human lips. Moody said later that he had a heap of respect for Bendry's command of language. They filled the Siscowit with corn and oats from the Swallow and employed a large number of Indians to cut a passage between two and three miles long through the ice, so as to float her out into the open water. They got her out on Christmas eve and arrived at Marquette on Christmas day, the sails frozen stiff and immovable and the ice a foot deep upon her deck. They had not seen land from the time they left L'Anse until they got into Iron bay, having all the time a heavy northwest gale and snow storm. There was much rejoicing when the schooner entered the bay. She was successfully unloaded, but in endeavoring to get her into Chocolay harbor she missed the channel and went ashore in the breakers, where she pounded to pieces.

During the winter the little colony at Marquette had only three or four mails. Mr. Harlow, the deputy postmaster, employed the Indian Jimmeca to go to L'Anse after the mail at a cost of $10 a trip. The manner in which Mr. Harlow came to be deputy postmaster is most curious. There had been neither postmaster nor postoffice at Marquette the preceding summer. All mail intended for the little colony on the shore of the lake, after being landed from the vessel, would be taken to the Jackson forge and the mail bag there opened by the postmaster, P. M. Everett. The mail, intended for Marquette, would then be returned by the carrier. A settlement had grown up about the Jackson forge and was called Carp River because it was at the point of the settlement that the river was crossed. The postoffice, therefore, was known as Carp River. After a mail had arrived by vessel it was particularly irksome to the little colony at Marquette to wait for it to be taken to Carp River, nine miles away, to be opened, and then returned. Letters were infrequent in those days and were eagerly devoured. Newspapers were also eagerly sought and a single newspaper would be read by the entire population. It was carefully wrapped in cloth as it passed from hand to hand to preserve it and its age was a matter of indifference to the reader. Just before the close of navigation, P. M. Everett brought down all the paraphernalia of his office to Marquette, which consisted of merely a few books and mail boxes, and appointed Mr. Harlow as the deputy postmaster. Everett and nearly everyone at the Jackson forge then left the country for the winter. Indeed not a vestige now remains of this settlement at Carp River. The bridge is down, the forge is gone, the houses have vanished and the forest has grown over the place as though the hand of man had never disturbed it.

In the spring of 1850 the old Jackson Co. was about ready to suspend. It had undertaken the herculean task of making iron a thousand miles away from the market. It owed even its own workmen. Mutterings were heard among the men and the rumor became pretty well defined that they intended to hang the president of the company, Mr. Czar Jones. At any rate Jones did not like the looks of things and sought out Peter White.

He told Peter that he had pressing business down below. "Down below" was the usual way of designating one's home. He asked Peter to guide him to Escanaba. Hard knocks had begun to put an edge on Peter. He was growing to be a sharp hand at a bargain. Moreover, since the calf incident he had a poor opinion of Jones. He declined to go. Jones raised his bid from $1 a day to $3 a day and promised to pay him for sixteen days, the time that Peter estimated it would take to go and come.

"If you will get Mr. Harlow as security I will go with you," said Peter finally.

White drew up a formal contract, but while Jones eagerly signed it Harlow was most reluctant to attach his signature. Noting this reluctance, Jones agreed to leave the money with Mr. Harlow to be paid to Peter upon his return.

"You will take along a man to carry the provisions?" asked Peter.

"Yes," answered Jones.

Peter used up full seven days in reaching Escanaba. Never since has anyone attempted such a tortuous route across the peninsula. If there was a jungle or a swamp Peter plunged through it with Jones a close second. Peter was thinking of that stolen calf.

"Haven't you lost the way?" wailed Jones a dozen times a day.

On the fourth day Peter paused and wiped his brow. He gazed about him with much perplexity of expression.

"Great heavens," said he, "I am lost."

Jones fell upon his knees. Despair was written upon his face.

"To pretend to be a guide," he moaned, "and not to know the way."

The truth of the matter was that Peter had been looking for the Escanaba river for a full day and had failed to find it. A little later, however, he came upon it, but Jones' nerves had been so wrought upon that he no longer trusted his guide. He started up stream upon his own hook.

"Come back," roared Peter, "you're going the wrong way."

The old man stubbornly continued up stream until Peter, running after him, broke the ice and showed him which way the current flowed. On the seventh day they reached Escanaba. Peter returned to Marquette in three days.

The forge of the Marquette Iron Co. went into commission in the spring and in the following July Mr. W. A. Fisher and Mr. Long of the company visited Marquette. One day Peter was not a little surprised to have Mr. Long send for him.

"We want you to have charge of the company's store, Peter," said Mr. Long; "what wages will you expect?"

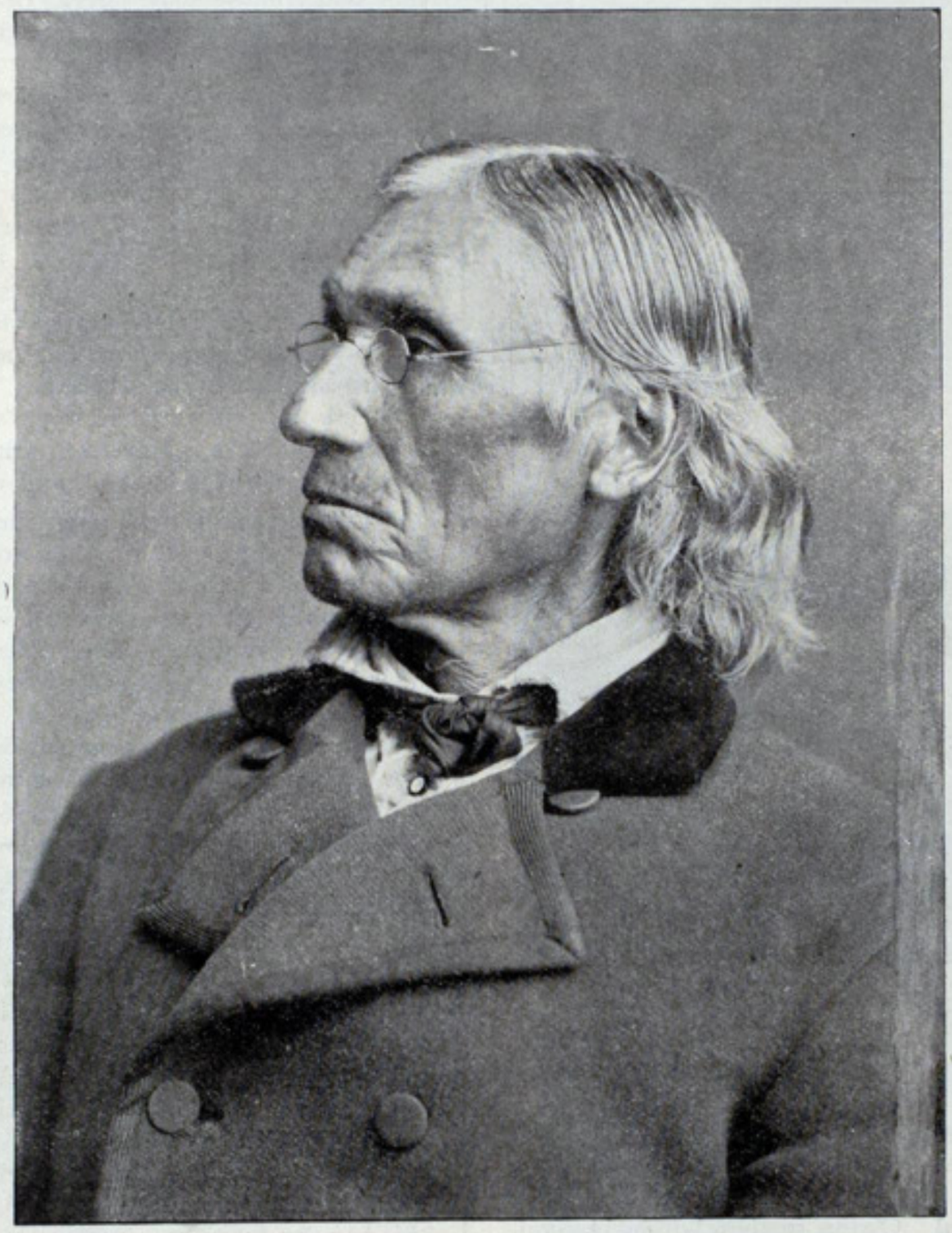
Peter had got out of the habit of expecting much from iron companies. Graveraet had offered him $12, and sometimes he was getting it and sometimes he was not.

"I would expect $24 a month," he said faintly, without much hope of getting it.

"Indeed," replied Mr. Long with some surprise. "Very well. We were expecting to pay you $45 but are glad to get you for $24."

Peter took the position but went out with a very sober face. He had learned that it does not pay to have one's aim too low.

In the fall of 1850 the pre-emptors gathered at Sault Ste. Marie, where the land office was established, to prove their claims to the iron deposits. Samuel Moody and Dr. Rogers had left Marquette in a small boat for the Sault, the former to claim the Cleveland deposit and the latter to claim the Lake Superior location. They were becalmed and did not reach the Sault on the appointed day. The Cleveland company, however, had not permitted its claim to lapse for an instant since Dr. Cassel's visit in 1846. It had its representatives present. They defended the claim of the original pre-emptor and conclusively proved that possession had been undertaken long before either Moody or Mann appeared. Papers were issued in the name of the Cleveland company and the contention of this company was later substantiated at Washington. Graveraet seems to have viewed this with complaceny, but was furious at the non-arrival of Rogers, who was to have secured the Lake Superior location in his behalf. He was white with rage when Isaiah Briggs stepped up and secured it on behalf of John Burt. Briggs was a packer of provisions for the surveying parties and had built a little shanty for himself and his pony on the Lake Superior location which he also used as a base of supplies. On the strength of this residence he secured the claim for Burt. Graveraet threatened to contest the claim unless Burt gave him a half interest in it at once, and Burt actually did give to Graveraet an undivided one-half interest in this enormous deposit. It has previously been shown that he had assigned a lease of this deposit from Rogers to the Marquette Iron Co. He now assigned this undivided one-half interest from Burt to the Marquette Iron Co.



Charley Bawgam, the full blooded Chippewa Indian, who met Peter White and his party at the mouth of the Carp river in 1848. He was then in the prime of life and is living in Marquette yet, a splendid specimen of his race. He is nearly 100 years old. This photograph was taken about four years ago.

The fame of Lake Superior iron was beginning to spread and was attracting practical ironmakers from Pennsylvania and Ohio. In the fall of 1850 B. F. Eaton and his brother, Watt Eaton, arrived from Columbus, O., to show the uncouth denizens of the peninsula how pig iron was made. They came with men and horses and supplies and a great flourish of trumpets and leased the Jackson forge. They swelled the natural population of Marquette to a considerable extent, and, indeed, it had been much augmented with other arrivals. The winter closed in without any provision for the delivery of the mails on the part of the government. During these latter days with mail service every hour or so this privation can not be appreciated. It is one of the things which one has to experience to comprehend its annoyance. Every man at Marquette had either a mother or wife and children behind. To see the winter inexorably close in and to know that one may not hear from them again until spring is a condition which a man who loves his family cannot endure. The thought is ever present that something has happened of which he is not cognizant. An imaginary evil is always greater than a real one. After a month or more had gone by without a mail the population became restless. A council was called in the Marquette Iron Co.'s store to consider the mail question. Everyone was present. The Eatons offered to give $500 to establish a mail service during the winter and others swelled the total to $1,200. The meeting disbanded after having instructed Mr. Harlow, the postmaster, to get someone to go after the mail.

Peter White's eyes had been standing out like saucers at the mention of these enormous sums of money. When the last man had gone he turned to Harlow and volunteered to become the mail carrier. Harlow laughed at him.

"Pshaw," said he, "you're too young. Besides you're not strong enough."

White, a powerful, broad-shouldered man nowadays, was at that time a slender chap. He was full bearded, however, and looked more than his age. His dress was picturesque. He wore a red flannel shirt over a hickory shirt, summer and winter, and in the winter time wore moccasins large enough to accommodate two or three pair of stockings. This was the usual garb of the pioneer.

"Will you hold my job for me?" asked Peter, who did not want to sacrifice his clerkship in the store.

"Certainly I'll do that," replied Harlow.

"Then I'll start the day after tomorrow," announced Peter.

And start he did. He got two Indians to go with him. His influence with the Indians was great and they would have gone with him to the pole. Hundreds of letters were written by the men when they learned that Peter was going to carry the mail. The whole town saw him off. The mail was very heavy, and what with the provisions, which also had to be carried, made a staggering load for his back. The mail was taken to L'Anse, where other carriers were met. Peter established a station where he might meet the carriers in the woods. It was as primitive as it well could be, Peter hanging the mail bag to the limb of a tree where the relay might get it. On the second trip he secured a dog sled and a team of dogs to ease his burden. The sled was flat like a toboggan and the dogs were mongrels, stout curs, capable of making between four and five miles an

hour. They had to be fed at short intervals to keep their temper and spirits at normal pitch. They became wildly excited at the scent of wolves and were almost unmanageable upon such occasions. The mail was securely strapped to the sled, Peter traveling alongside of it on snowshoes, controlling the leading dog by a string rein and using a staff to stop the sleigh by pushing it into the snow. He made nine of these trips during the winter, and they furnish the base for many of the legends of the upper peninsula. The lore of the French Canadian, in particular, is full of stories of Peter and his Indians and his dog sleds.

For these nine trips Peter received the aggregate sum of three dollars. Eaton's $500 and the other pledges, amounting to $1,200 in all, never materialized. They never paid him a cent. Among those who attended the meeting was Silas C. Smith, who had pledged $3. Meeting Peter on the street one day he gave him the money.

"What's this for?" asked Peter.

"Your mail service," replied Smith.

Peter, to Smith's astonishment, handed back the money without explanation.

"I'll tell you some day," said he.

A year later he told Smith that he didn't want him to stand the whole expense of the nine trips. Peter has never regretted this experience, however. It strengthened his muscles and his constitution, and gave to him

MARQUETTE IN THE SIXTIES.

that wonderful physical base which even today makes him one of the most active of men.

It was during the winter of 1850 that ore was first hauled from the Cleveland location, which was, as shown, claimed by the Marquette Iron Co. The ore had been mined during the previous summer and put into the stock-pile to await the winter's haul. Owing to the abominable condition of the roads, and in some places to the absence of any roads whatever, it was impossible to haul ore to the lake during the summer. The Cleveland mine lay two miles beyond the Jackson mine and the distance was regarded as a considerable item. During the preceding winter of 1849 the snows had been so heavy that no attempt was made to haul ore from the Cleveland mine. The little quantity that was hauled from the Jackson mine during the winter of 1849 was speedily consumed, and the forge had to suspend operations during a part of the summer for want of ore. Another great difficulty was the impossibility of keeping a sufficient stock of charcoal on hand to keep the forge running. The charcoal in those days was all burned or charred in pits. Such a thing as a charcoal kiln of brick or stone was unknown. The deposits fortunately needed no appliances, such as drills and powder to work them. If they had they probably would not have been worked, as there was neither drills nor powder in the peninsula. Nature by frost or some other means had loosened up thousands upon thousands of tons of as pure ore as ever was mined, so that any common laborer had only to pick it up in his hands and carry it to the stock-pile. In some instances the pieces had to be sledged into smaller dimensions in order to be lifted into the sleigh. During the winter of 1850 about twenty-five double teams were employed in hauling the ore to the forge at the lake where it was crushed and then made into bloom iron, ready for shipment. This venture of making blooms was most disastrous. The cost of hauling the ore to the lake, the cost of the operation of the forge, the long carriage to the mills of Pennsylvania and Ohio made the cost of the blooms so excessive that it was impossible to recover. By the time the blooms were laid down in Pittsburg they had actually cost $200 a ton and the market rate for iron was then $80 a ton. None of the ore itself was shipped below. This thought had not occurred to the pioneers. In the spring of 1851 Ben Eaton, who had come into the country so bravely the year before, fled. He went to the most remote corner of the globe that he could find—Australia—and so far as known never returned.

In the summer of 1851 Peter White went fishing. He might, indeed, have gone fishing all summer for all there was doing. It was a time of woeful stagnation. There was no money and little of anything else in the peninsula. When he returned from his fishing expedition he found that the county of Marquette had been organized and that he had been elected county clerk and register of deeds. Peter protested that he was not yet of age. He was promptly told to keep still about it, as it was necessary that the county clerk should be a person who could write and that he was one of the few who could. At that time Peter would readily have passed for a man thirty years of age. He wore a full black beard, which gave him a mature look. The appointment of clerk carried with it membership in the school board and he was elected treasurer of that body, an office which he has held continuously since. In the selection of Peter White as county clerk there was probably an intention in the minds of the inhabitants of Marquette to compensate him for services rendered. He had really earned the office of county clerk. Marquette had previously been attached to Houghton county, the county seat of which was Eagle River. One of Peter's thrilling experiences had been a trip to Eagle River, on foot and alone, to get the county clerk's certificate to a lot of legal documents. This intrepid young man, who seems to have been born without fear, went first to L'Anse, then across the ice to Portage Entry, then up the river and over Portage lake and across the portage to Eagle River. His business despatched, Peter prepared for the home journey.

"When do you return?" asked Mr. Kelsey, the county clerk.

"Tomorrow," replied Peter.

"Oh no," answered Kelsey, "we never allow a winter visitor to depart under two weeks. Moreover, you are the first man that ever came from Marquette up here by land, and we must give you a good time."

Peter was somewhat frightened at the prospect. He never had been a social lion and he didn't want to be one. He would much rather have been permitted to go home quietly, and he thought for a time of cutting and running. But they were all so very friendly and so courteous that his fears were dismissed. And, indeed, they very well might be. The very next evening they gave a big party in honor of Peter White and scheduled an even more elaborate one for the following evening. Peter protested that his apparel was not suited for parties, and for reply they took him to the leading clothier and made him don the most elegant suit of clothing in his shop. This round of festivity continued for nine days. He will tell you candidly today that it has not been equaled in all his varied career since. When he came to leave he was offered all the silver specimens and agates that he could carry. But Peter had been attracted by the cuisine, and, moreover, his wants were very simple.

"Let me take two cans of those elegant cove oysters to my Carp river friends," said he, "and I will be delighted."

Peter worked his way back as far as Portage Entry and found the ice in L'Anse bay all broken up. At that time copper mining on Portage lake had not been dreamed of. Upon his arrival at the entry he was laid up for three days with "le mal de raquetté," or snow-shoe sickness. As soon as he could travel he set out through the woods for the Catholic mission. He knew nothing of the route except to keep in sight of the bay, and this he soon found was impossible, owing to the impenetrable nature of the underbrush. So he struck back into the woods for better walking. The distance he had to go was seventeen miles and it seemed to him as though he had already traveled thirty. It was very cold, twenty degrees below zero, he had had no dinner and night was coming on. He crossed a little valley, and, as he mounted a hill, looked back and caught the only glimpse of the sun he had had that day. He knew that in order to reach the head of L'Anse bay he ought to be going towards the setting sun instead of from it. He changed his course in that direction and presently came across a single snow-shoe track, and was pleased to think that he was getting where someone else had so recently been. In a little while he crossed other tracks, and shortly thereafter another, and it soon dawned upon him that they were all his own. He had been traveling for hours in a circle, only enlarging it a little each time. It was now growing dark rapidly, and Peter had to make preparations for spending the night with the wild beasts of the forest. He had no axe or provisions, except the two cans of cove oysters, but fortunately he had a few matches. He succeeded in starting a fire at the foot of a dead cedar that leaned over into the forks of a hemlock, and as fast as it would burn to a coal it would slide down a little and thus replenish itself. Peter was too much excited to be either tired or hungry that night. He slept a little in an upright or sitting posture before the fire. The snow was about five ft. deep. He had shaped an indentation of his own figure like a chair into the snow and lined it with balsam sprigs, so that it was quite comfortable. In the morning Peter broke every blade of his congress knife in trying to open the cans of oysters. Failing in the attempt, he boiled them in the can and endeavored to eat them. Endeavored is used advisedly. He did not eat them. They refused to be eaten. They would not stay upon his stomach.

Bishop Baraga had left the entry after Peter, and therefore knew that he was either hurt or lost. He sent an Indian after him. The Indian found him about 3 o'clock and took him to the mission. The rest of the journey homeward was without incident.

CHAPTER II.

W. H. Bruce was the general mail contractor for the upper peninsula with headquarters at Green Bay, Wis. In widely-scattered and primitive settlements the government has a habit of letting the distribution of the mail by contract. It saves the bother of Washington forever seeking or finding a man for some place which is so small as not to be even definitely located upon the map. So W. H. Bruce of Green Bay, Wis., was in general charge of the mails for the upper peninsula. The forwarding of the mails in the winter time didn't worry Bruce much, for he realized the utter impossibility of reaching some of the more remote settlements through the great banks of soft and yielding snow. And so it happened that during certain seasons of the year Marquette and vicinity were shut out from the rest of the world. When Bruce examined his lists he came across P. M. Everett's letter resigning the postmastership of Carp River, which had been forwarded to him by the postoffice department.

"Carp River is vacant," said he to himself.

Bruce knew, or thought he knew, that Carp River was quite an important settlement in the rising iron country. He had heard a great deal of it. He had not heard of the processes of decay which had already resulted in its virtual abandonment. Meanwhile Mr. Harlow had secured the definite appointment as postmaster of Marquette. Bruce accordingly cast about for a postmaster at Carp River. Peter White's father was managing Bruce's business at Green Bay, and it was very natural that he should think of Peter White. As a matter of fact, he couldn't think of anyone else, for Peter White was the only person he positively knew to exist in the peninsula. Accordingly he instructed the postoffice department to appoint Peter White postmaster at Carp River. It never occurred to him to say anything to Peter White about it. The entire population of Marquette was therefore considerably astonished when the first vessel to arrive in the spring of 1852 brought a formidable looking letter, thick and bulky, bearing the seal of the United States government, stamped free, and addressed in big handwriting to Peter White. Peter was the most astonished of all. He did not suppose that anyone beyond his circumscribed little world had ever heard of him, and especially not so mysterious and mighty an institution as the United States government. It was the use of the franking privilege that bewildered him, for he was the first person to be ever so addressed in the peninsula. Peter flatly declined to open the letter. He was afraid of it. He said that he hadn't done anything against the government and he didn't want the government to do anything to him. Moreover he did not want to put himself in the position of being responsible to the government for any of his acts, and he felt that he would be if he opened the letter. He declared that it was perfectly clear that the letter was not intended for him, even if it bore his name. There had been some mistake to which he did not care to be a party. Letters in those days of infrequent mails were common property, and a town meeting was held to discuss the purport of the prodigious document addressed to Peter White. The meeting was held in Peter's boarding house, and Mr. Jacobs, a somewhat forceful character, acted as chairman.

"I will open the letter," said Jacobs, "and take the consequences."

Jacobs opened the letter and read the blank application of Peter White for the postmastership of Carp River. If Peter had been alarmed before he was greatly mystified now. He could not conceive how the government could have possibly become possessed of his name.

"Let's fill it up," said Jacobs.

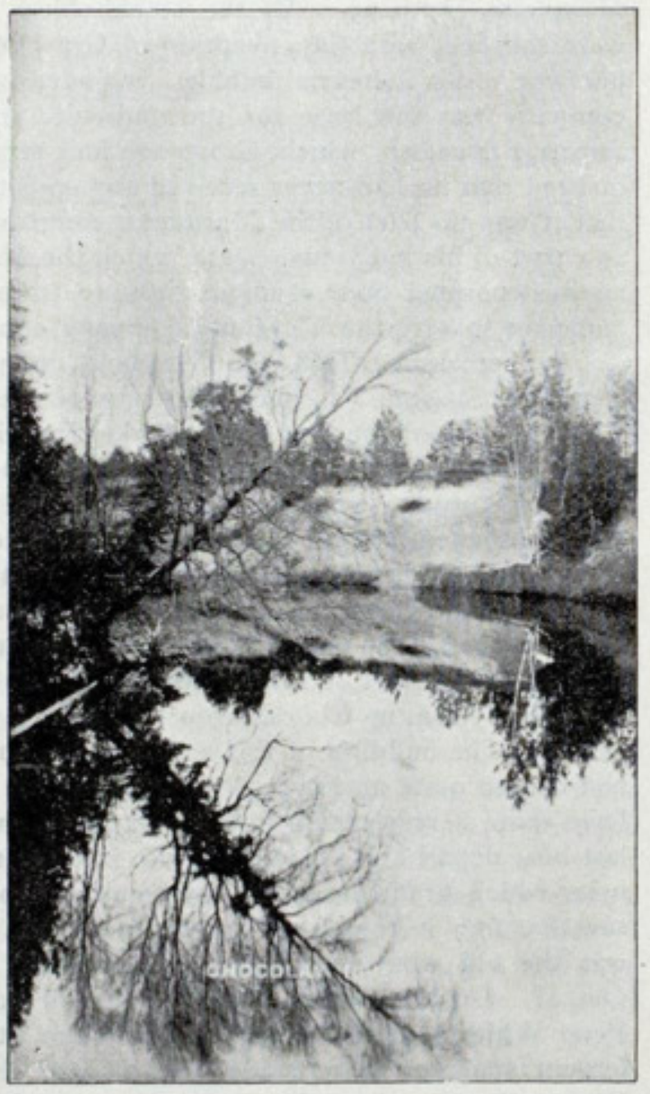
"It isn't meant for me, and I'll not accept the office," said Peter.

Jacobs without replying began to read aloud the provisions of the application. He came to the clause which provides that the applicant must receive the indorsement of the nearest postmaster. Jacobs knew that it would be useless to refer the application to Harlow for indorsement, because Harlow knew that there was no necessity for a postmaster at Carp River.

"The nearest postoffice," ruminated Jacobs, "means, of course, the nearest postoffice. They don't mean the nearest postoffice to Green Bay or Marquette, but the nearest postoffice between here and Washington. That's Sault Ste. Marie. We will send this application for indorsement to Mr. Ashmun, the postmaster at the Sault. And we'll all sign it."

Capt. Caldwell volunteered to take the application to the Sault. In the course of two or three weeks a mail bag with complete postal equipment came for Peter White, together with his appointment as postmaster at Carp River. Peter viewed his new office with considerable fear. He was afraid that his employer, Mr. Harlow, postmaster of Marquette, would incontinently discharge his clerk, the postmaster of Carp River. But Harlow took no cognizance of his rival. All mail, of course, came to the village of Marquette. Gradually it was noted, however, that more mail was addressed to the postoffice at Carp River than was addressed to Marquette. A circumstance which aided this diversion of the mail was the fact that Harlow held the postoffice in his house. There was ever present, therefore, that delicacy which prevents a man from freely entering another one's home, even when public affairs call him there. Peter held his postoffice in the store, where everyone, of course, felt himself free. The residents of Marquette were putting the words "Carp River" on their letter heads while writing. The diversion of the mail eventually became so complete that Harlow was merely receiving and transmitting only the mail of his own family. The stamp of the Marquette postoffice was therefore placed upon an extremely limited number of letters, while the stamp of the Carp River postoffice on an adjoining lot was being imprinted upon hundreds. The postoffice department finally concluded that the population of Marquette was well nigh extinct, but that the population of Carp River was growing rapidly. When the postal department reached this conclusion it notified Mr. Harlow that the postoffice at Marquette would be discontinued. This constitutes probably the only instance on record where a town of 1,500 inhabitants had two postoffices. The mail of Marquette continued to bear the Carp River stamp for some time thereafter, or indeed until the inhabitants suggested to Peter White the advisability of writing to Washington and having the name of the Carp River postoffice formally changed to Marquette. This was later done, and Peter

SCENES IN PETER WHITE'S COUNTRY.



CONTRASTS IN CHOCOLAY AND DEAD RIVERS.

White continued in office as postmaster altogether for twelve years. If Harlow was ever cognizant of this extraordinary situation he never referred to it.

CHAPTER III.

The pioneers in the iron industry in the peninsula had little money. There was no influx of eastern capital to help them over the periods of depression. They were compelled to take all the knocks that adversity had to administer, and some of them were pretty severe. The weaker failed; but those who had faith in the ultimate development of the mines gripped a tighter hold and hung on. Men placed in crucibles of fire come out either heroes or villains. The cruel process develops some and destroys others. The struggle certainly bred a race of hardy men and a few of them were even great. Peter White, the boy, had the advantage of association with those men, and could not fail to be improved by it. It has been told that the only method of bringing ore to the lake from the mines was by means of sleighs during the winter time. It became apparent that if any considerable business was to be done the means of communication would have to be improved. The average load of a sleigh was 3,600 lbs. or a little less than 1½ gross tons, and it was impossible for a team to make more than one trip a day. Indeed the whole winter's haul rarely exceeded 1,000 tons. Moreover, it began to be apparent that the great business of the region was to be done in the mining and shipping of ore, and not in the manufacture of blooms. Among the men attracted to the peninsula was Heman B. Ely, who, as soon as he saw the deposits, recognized the need of a railway. He approached both the Cleveland and Jackson iron mining companies upon the subject, and in November, 1851, drew up an agreement wherein he agreed to build a railway from Marquette to the Jackson and Cleveland mines in consideration of receiving the carrying trade of both companies at certain reasonable rates of toll. The companies agreed to pay $1 per ton for the transportation of ore over the road during the first two years and 50 cents thereafter until the amount reached an annual total of 70,000 tons, when a graded rate gradually diminishing to 30 cents when 125,000 tons per annum had been reached, should obtain. This road was to be known as the Green Bay & Lake Superior Railroad Co., a title which sufficiently indicates that Mr. Ely had in mind its extension to that other ore outlet upon Lake Michigan. Mr. Ely, however, had difficulty in enlisting capital in the enterprise. Men with money looked coldly upon the project of building a railroad in a wilderness and the undertaking consequently lagged. Money was, indeed, so stringent that upon one occasion in 1852 Mr. Ely had to sell some of his provisions in order to obtain the means wherewith to get out of the country. This act caused Mr. Tower Jackson, the first mining agent of the Cleveland Iron Mining Co., to deliver a philippic against steam railroads in general, and to declare that a plank road was precisely what the region needed. He maintained that a plank road would promote agriculture in that it would be of direct benefit to the farmers and would stimulate ore shipments in that it would provide a means of communication to the mines all the year round. A steam railroad, he insisted, would merely fill the pockets of eastern capitalists and ruin the iron country.

Meanwhile Peter White performed an historical act. He made a bit of history. He wrote the bill of lading of the first shipment of ore that ever left the upper peninsula. The shipment consisted of seven barrels, and was consigned to B. L. Webb of Detroit, by the Marquette Iron Co. It was shipped to Sault Ste. Marie on the steamer Baltimore.* There is a report of a little ore having gone prior to this to A. L. Crawford, Newcastle, Pa., but there is no record extant of it.

The Cleveland and Jackson companies waited patiently for over a year for Ely to begin the construction of his railroad, and perceiving no signs of any movement on his part, undertook jointly the construction of a plank road from the lake to the mines. This was a considerable undertaking and was prosecuted with as much vigor as any undertaking could be which was nearly 1,000 miles removed from the supervision of the home office and which had to be built under adverse financial circumstances. Director after director of the Cleveland and Jackson companies visited the iron region to superintend the work and the most energetic of all was Dr. Morgan L. Hewitt, the first president of the Cleveland company.

Another undertaking, which like the railroad seemed almost a dream, was the construction of a canal around the rapids of the St. Mary's river, connecting Lake Superior and Lake Huron. It was a dream because it had been discussed for years and seemed no nearer realization than in the beginning. There was absolutely no sympathy in Washington with the enterprises of the peninsula. Daniel Webster's declaration, that never would he vote one penny to bring the bleak, barren, rocky and uninhabitable shores of California one step nearer Boston, was on a par with a similar declaration of Henry Clay, that under no circumstances could the expenditure of public money for the construction of a canal in a remote and worthless region be justified. He was referring to a measure before congress for the construction of a canal at Sault Ste. Marie. These men were great, but they had no knowledge of what they were talking about. However, in 1852 congress granted to the state of Michigan 750,000 acres of land for the purpose of aiding in the construction of a canal around the falls of the St. Mary's river. This grant of land was accepted by Michigan and in consideration of it a number of gentlemen undertook the construction of the canal. As a matter of record, it is well to note that these men were John F. Seymour, Erastus Corning, James F. Joy, J. W. Brooks, J. V. L. Pruyn, Joseph P. Fairbanks and John M. Forbes. Mr. Charles T. Harvey was placed in charge of construction and broke ground for the canal on June 4, 1853. Mr. Harvey also selected the lands for the company, choosing 262,283 acres of iron lands in the upper peninsula and 487,717 acres of pine lands in the lower peninsula. The 30,000 acres which he selected in Marquette county were subsequently sold to the Iron Cliffs Co., of which the late Samuel J. Tilden was the leading spirit, for $500,000. Among the copper lands selected by Harvey was the quarter section on which the Calumet & Hecla Co.'s mine was subsequently located and which was sold to that company for $60,000. This mine has since returned to its stockholders the amazing sum of $70,000,000 in dividends and is still declaring them at a bewildering percentage upon the capital invested.

In May, 1853, the Marquette Iron Co. gave up the ghost and Dr. Morgan L. Hewitt moved his small family to Marquette—two most important events in the life of Peter White—for through the first he became connected with the Cleveland company and through the second he met Ellie Hewitt, Dr. Hewitt's daughter. The Marquette Iron Co. had had a hard time of it. Mr. W. A. Fisher, the capitalist of the company, gradually lost heart when he found that the Cleveland company had really a prior right to the claim and his support for two years had only been lukewarm. It was a constant drain upon his resources, with mighty slim chances of any return, and he welcomed the opportunity extended to him by the Cleveland company to reimburse him for the improvements which he had made. Indeed the Cleveland company exhibited the utmost generosity toward its rival. It purchased the assets of the Marquette company and incidentally purchased Peter White, who was keeping the store for the Marquette company. All the stockholders of the Marquette company were satisfied, with the exception of Graveraet, who recognized in it the bursting of his industrial bubble. Included in the assets of the Marquette company was the lease for the undivided one-half interest in the Lake Superior location, which Graveraet had secured from Burt. Graveraet insisted that he had never received any consideration for this interest, and that it was no part of the Marquette company's property. He claimed it as a part of his individual estate, which the Marquette company, not being an incorporated body, had no right to transfer, and his contention was sufficient to give the Cleveland company considerable concern.

In September, 1853, the Cleveland company shipped to the Sharon Iron Co., Sharon, Pa., about 150 tons of ore for use in its blast furnace. This constituted the first use of Lake Superior ore in any blast furnace. There have been rival claimants for this honor, but this was actually the first and it was a success. The ore was rich beyond expectation. Others who subsequently tried to smelt the ore failed to make iron, owing to its very richness, and this gave rise to a report that the ore was not susceptible to blast furnace treatment. It was the very circumstance of this initial success that changed the destiny of the old plank road. It was decided to convert it into a strap railroad at once and the rails were accordingly sent up from Sharon. The work was pursued with the utmost energy. The building of this road and the growing fame of the iron hills had caused quite an influx of people, so that Marquette was beginning to have quite a respectable number of inhabitants. These recruits saw the last boat depart and the winter close in upon them with feelings of uneasiness, which gradually gave way to uncontrollable impatience when they saw that they were not going to get any mail during the entire winter. It was the old story over again. In fact the last mail was delivered on Oct. 17. On Jan. 8, 1854, the people could stand it no longer and sent for Peter White to attend a mass meeting which they had called. Intense and fervent speeches were made, but all had the same ending—that Peter White should go for the mail. No one else was thought of. He was regarded as some mysterious genie who with a dog and sled could penetrate the trackless wilds and bring the precious mail out of its hiding place. So with six Indians and three dog teams of three dogs each, Peter White again went after the mail. Peter and the Indians took away nearly 1,000 letters to be posted. They plunged into the woods at the mouth of Carp river, but found snow-shoeing tedious work, as the snow was very soft. On the seventh day, while making slow work of it in the deep, wet snow which covered the ice of Cedar river, near Green Bay, they espied in the dim distance what appeared to them at first like five immense loads of hay slowly crawling toward them. A little later the strange spectacle came more definitely into view and was seen to be five double teams with five sleigh loads of United States mail, bound for Lake Superior places, via Escanaba and Marquette, in charge of Daniel M. Whitney of Green Bay. This mail weighed between seven and eight tons. It may be imagined that the meeting of these two caravans was most joyful. Mr. Whitney said that the postoffice at Green Bay was filled to overflowing with mail and that the postmaster at that place had taken the most doubtful responsibility of employing him to make one trip. Whitney had engaged ten men, Indians and French, to help him. Peter White took charge of the party, and loading up his dog sleds with the contents of one of the sleighs he

*Fortunately this bill of lading has been preserved and is now framed and hanging in the office of D. Z. Norton of the firm of Oglebay, Norton & Co., in the Wade building, Cleveland.

sent the entire party, dogs, sleds, French and Indians on to Escanaba and Marquette while he and Mr. Whitney drove in the sleigh which had just been unloaded to Green Bay. It might be well to follow the mail before following the immediate adventures of Peter White. After great tribulations, delays and troubles, the mail reached Marquette on Jan. 21, which was really very good time considering the fearful conditions of the roads, which were made almost impassible by melting snows. The dog teams were dispatched ahead of the others with the letter bags. Nearly half the population of Marquette went down as far as the Carp to meet the mail and to help carry it into town. As the savages of some of the southern climes are wont to gorge themselves with food to unspeakable excess and then sleep for days thereafter, so did the people of the little village give themselves up to a riot of reading. No work was done for two days. The paper mail came a week later but it was so worn and wet that most of the addresses were undecipherable. However, that was no matter, as perfect communion prevailed in the ownership of newspapers in those days.

Meanwhile the subject of our story was holding a heated argument with the postal authorities and with Gen. Lewis Cass, who was Michigan's representative in the United States senate. On his arrival at Green Bay he found that Mr. Hicks, the postmaster, had on hand twenty-four bags of mail matter for Lake Superior. Each bag held four bushels. He found, moreover, that the mail was accumulating at the rate of six bushels a day and the Green Bay postmaster was in a quandary as to what to do with it. He had employed Mr. Whitney to make one trip to Marquette at enormous cost on doubtful authority.

"Something's got to be done," said Peter, who had before him at all times the frenzied population of Marquette and who did not want to return without the message that he had arranged a definite schedule for the mail.

The nearest telegraph point was Fond du Lac and thither he journeyed to wire Senator Cass. The extraordinary number of words which the young man used (for telegraph tolls were very high then), the vigor of language, the fact that he transmitted the major part of the resolutions adopted by the citizens of Marquette setting forth the immense value of the iron and copper mines and denounced in unmeasured terms the apathy of Gen. Hester L. Stevens, their representative in congress, to the needs of the community, together with the withering scorn and invective directed against the postoffice department, convinced Gen. Cass that an insurrection was imminent in the peninsula, and he hastened at once to the postmaster general with the dispatch from his impetuous young constituent. But even this was not enough for Peter. He bombarded Cass for two days with telegrams so impudent that he would not dare today to send them to anyone. Gen. Cass replied that he appreciated the importance of his mission and told him that he had written him at Green Bay and to await the receipt of the letter. In three days the letter came, inclosing several from the first and second assistant postmasters general, informing him that the Hon. Henry Hart, a special agent of the postoffice department at Adrian, Mich., had been wired to meet him at Green Bay. The telegraph operator sought to beguile away the interval of time by presenting Peter with a bill for $66. Peter was ever a thrifty lad and the size of this bill was to him appalling. He supposed that he had contracted an expenditure of about six dollars. He found some, though not a total consolation in the fact that it would not have to come out of his own pocket.

In his frequent visits to the postoffice at Green Bay Peter had noticed that the postmaster had accumulated a lot of canvas mail bags, perhaps 200 in number, and they were folded double and piled up like stove wood in neat piles in the woodshed attached to the postoffice. The postmaster consented that Peter should try any desired experiment with them—provided he did not injure them. So Peter diligently employed the days while awaiting the arrival of Special Agent Hart in making up bags of bags, leaving a vacuum of about 18 in. in the top of each bag of bags, into which he closely packed from the other bags mail matter addressed to Lake Superior points. He then carefully closed them with the puckering strings, leaving an opening on top of each bag of 5 or 6 in., with the addressed side of each paper upward, so that the merest look would convince anyone that that was a bag of mail for Lake Superior. Then these deceptive bags were stocked, end on end, in tiers three stories high, nearly reaching the ceiling in the back room of the postoffice and wood shed. Thus the thirty odd bags of mail had grown into 120 large bags of mail. When the special agent arrived, in the course of four or five days, he surveyed the accumulation of mail with wonder and saw that an emergency existed. He surveyed the accumulation, however, upon a full stomach, for Peter was careful to meet him at the stage and to escort him to the Astor house, where a supper of oysters and champagne was given to him before proceeding to business. Peter was very polite, indeed, to Mr. Hart. The special agent at once approved the temporary contract that had been made with Mr. Whitney for the one trip and authorized a new contract for one trip a week from Green Bay to Lake Superior. Peter continued to entertain him for two or three days thereafter with such princely liberality that Mr. Hart made an order increasing the service to three times a week before he left. The peninsula never thereafter lacked for mail facilities and Peter White's return to Marquette was one of triumph.

CHAPTER IV.

Meanwhile Peter White was doing a lot of thinking. He saw the gradual unfolding of the industrial panorama and he began to perceive opportunities for making money on his own account. He was shut out from making iron ore investments, for that required capital and he had only his savings. He possessed, however, the natural instinct of a merchant. He was essentially by disposition a buyer and seller, and resigning his position with the Cleveland company, he opened a store of his own. He conducted it with profit but sold out when he saw a better opening in the insurance business. He has always had the eyes of a hawk for opportunity. Then he began the business of banking in a small way. When W. J. Gordon, afterward a well-known capitalist and philanthropist of Cleveland, visited the iron region for the first time in 1854, having joined the Cleveland company, he was attracted to Peter White instantly—and W. J. Gordon could see through a cast iron vault. To take a man's measure at once was an instinct with him. He was a truly great man, many-sided, bold and complete. He grasped the nature of the iron deposits, their marvelous extent and future influence almost before any man did. He saw, too, that Peter White was as sensible a young man as lived in that region and he came to rely upon his judgment. He never submitted a proposition to his directors when he was in the peninsula that he did not first submit to Peter.

But what days of stress and turmoil they were. The Cleveland company permanently abandoned the making of blooms when the forge burned down in December, 1853, and devoted itself to the mining and shipping of ore. There were approximately 1,000 tons of ore on dock when the season of navigation opened in 1854. The winter had been a bad one for hauling the ore in sleighs. The average load was a gross ton and only about fifteen tons could be brought down per day. The tariff for the haul from the mine to the lake was $3 per ton and the price of the ore on dock at Marquette was $8 per ton. The cost of mining was 50 cents per ton—a magnificent profit, indeed, if any volume of business could be transacted. Nearly the whole of the 1,000 tons of ore on dock when navigation opened in 1854 was taken by the Forest City Iron Co. It was wheeled aboard the propellers Sam Ward, Napoleon and Peninsula in barrows and dumped upon the deck. At the Sault it had to be unloaded and carried over the portage, where it was again wheeled upon vessels and taken to the lower lake ports. Prior to 1851 the entire freight to and from Lake Superior was cared for at the Sault by Sheldon McKnight and his old gray horse. This faithful animal hauled every pound around the rapids. The discovery of the mineral deposits, however, brought such a flood of prospectors and miners that McKnight and his old horse had more than they could do to handle the material. So McKnight built a strap railway about a mile long around the rapids. He placed a number of cars upon it and drew them with horses. What with the transit of iron and copper down and with machinery and provisions of all kinds up, McKnight did a flourishing business and the Sault became a distributing center. The thought of a canal at the Sault was gall and wormwood to McKnight. He fought the project bitterly, opposing it at every step, declaring that it was unnecessary and that it would kill the Sault. This last argument found a responsive chord in many a breast, for a number of men gained their livelihood in the rehandling of freight at that point.

The strap railroad to the mines was not ready for use during the winter of 1854 and the ore was carried down in sleighs as usual. The projectors called it the Iron Mountain Railway Co. Heman P. Ely was busily engaged also in the construction of his railroad, which he called the Iron Mountain Railroad Co.—a distinction in terms sufficient to confuse anyone who endeavors to trace the history of the peninsula from the very manuscript of those who made it. However, they were distinct corporations, as was quite apparent at the time, for Ely served an endless number of injunctions upon the contractors and workmen who were engaged upon the Iron Mountain railway. There were innumerable disputes regarding the rights of way, and things finally got to such a pitch that the court appointed Charles T. Harvey as arbitrator to determine where each roadbed should be laid. Nerves were at the highest tension, for work upon the canal at Sault Ste. Marie was progressing rapidly and everyone wanted the line of communication to the mines to be finished first, in order to care for the heavy shipments that were bound to follow. But, alas, notwithstanding the heroic efforts put forth, the canal was opened before the strap railroad was finished. It was an era of the wildest excitement in the peninsula. Cholera had broken out once and hundreds had died in building the canal, but now the great work was done. Water was let into the canal on April 19, 1855, and on June 4 it was opened to commerce with John Burt as its first superintendent. The steamer Illinois was the first vessel to pass up and the Baltimore the first to pass down on the day of the opening. The North Star, however, was the first vessel to reach Marquette through the canal, having made the trip from the Sault in a little less than eight hours.*

*This vessel was a side-wheeler and was one of the swiftest on the lakes. She was not alone swift for that day, but she would be considered swift even at this day. Her speed was over 20 miles an hour, and one of her signal achievements was a round trip from Cleveland to the head of the lakes in a little over five days—a remarkable performance when one considers the uncharted and unlighted condition of the channels in those days. The North Star was wrecked in 1863.

When the trim hull of the North Star shot into Iron bay the people of Marquette nearly went wild. She signified so much to them. She had come as a deliverer. She had burst the bars that had so long caged the peninsula and was the first to bring the message of emancipation. Her name, too, North Star, was so appropriate for this great northern sea. The people on seeing her gave vent to a mighty outburst of patriotism. Dr. Morgan L. Hewitt was deeply stirred, as a letter written by him upon the occasion shows. He ran up the American flag upon the city flag-staff and every man who had a gun fired it off.

It is a matter of historical importance that the Cleveland company was the first to utilize the canal for the shipment of ore. The brig Columbia, Judson Wells, master, left Marquette on Aug. 14 with 132 tons of ore consigned to the Cleveland Iron Mining Co. and passed through the canal on Aug. 17. During the year the Cleveland company shipped in all 1,447 tons of ore, which constituted the entire shipments of the peninsula for the season, the other two companies, Jackson and Lake Superior, not being prepared to ship any at all.

Among the property purchased from the old Marquette Iron Co. by the Cleveland company was sixty-four acres of land in Marquette, and in 1855 the company turned the management of this estate over to Peter White. This got the young man into the real estate business head over heels, in which he has continued ever since with marked success, for Marquette is practically built upon land which Peter White has sold. He had also begun the business of banking in a small way.

The old strap railroad went into operation in the fall of 1855 and lived a strenuous life for two years. The motive power was mules and the cars held about four tons each. The grades were simply frightful and the cars frequently ran away, mangling the mules and jumping the track at the first curve. At the first sign of trouble the driver could slide off the car into the soft sand at either side of the track, but the poor mules had no protection. It was pretty expensive business. Mules were costing $1,400 per pair in the peninsula and hay occasionally went to $50 per ton. The track, too, was constantly getting out of shape. Both companies realized that the strap railroad would never do, and when congress passed the land-grant act to stimulate the construction of railways in 1856 overtures were made for consolidation with Ely's steam railroad. At this juncture Heman B. Ely suddenly died in Marquette, but the work which he had undertaken was assumed by his brother, Samuel P. Ely. The legislature of 1857 was to distribute the lands granted by congress and it was of vital importance that a person familiar with the situation in every detail should represent Marquette in the assembly. The result was that Peter White ran for the legislature. There was someone else running also somewhere in the peninsula and as far as known he may be running yet for he was not heard from at the polls. Peter's appearance at Lansing created a sensation. It took him fifteen days to get there. He made the journey on snow shoes from Marquette to Escanaba, took the stage to Fond du Lac and walked the rest of the way to Lansing. Everyone was on the qui vive at Lansing for the representative from Marquette, for they realized the almost insurmountable obstacles which stood in his way. Peter was heartily cheered as he took his seat among them. Something of his reputation had preceded him and he always had an audience in the committee room eager to listen to the story of his experiences in the trackless north. Legislation then was beset with the pitfalls and handicaps that mark it now. There was much wrangling over the distribution of the grant—far more, indeed, than the exigencies of the case demanded—and Peter quickly observed that with the lobbyists out of the way the representatives could readily dispatch in an honorable manner the business for which they had gathered. He made a speech in which he pointed out the unwarranted interference of those who were serving no great constructive interest and who did not have the development of the state at heart and declared that they were "thick as autumnal leaves which strew the brooks in Vallombrosa," a simile so apt and so sonorous as to establish a reputation for erudition instantly. They did not know that Peter the evening previous had begged a learned friend to furnish him some quotation that would fit the particular point he wished to score. Hence Vallombrosa. Peter did good work in the legislature and the grant was carefully distributed. He walked back to Marquette and it was twenty years before he again served the people in a legislative capacity.

(To be continued.)

A STRIKING ACHIEVEMENT.

A most striking achievement, and one which has far-reaching consequences, is the successful experiment under the direction of Signor Marconi of telegraphing across the ocean without wires. There seems to be no doubt that this remarkable feat was accomplished. Signals were sent from Cornwall, England, to St. John's, New Foundland. When Marconi left England two weeks ago he arranged for the Cornwall station, which is equipped with a most powerful battery, to signal the letter S between certain hours. He then elevated at St. John's a kite with an ærial wire, by means of which signals are sent or received. The signal S, which is transmitted in the Marconi code by three dots, was repeatedly received on three successive days between the hours specified. There can be no doubt that it was a genuine transmission from England. It is, therefore, clear that communication with vessels in mid-ocean is one of the triumphs of the immediate future.

SHIP YARD NOTES.

The Tacoma Ship Building Co., Tacoma, Wash., launched its second vessel this week. The vessel, a four-masted barkentine, was christened Thomas P. Emigh. She is 235 ft. long, 42 ft. beam and 16 ft. deep. She is being built as a lumber carrier for the Charles Nelson Co. of San Francisco. A third vessel is now under way in the yards of the Tacoma Ship Building Co.

The five-masted wooden schooner which the Holmes Ship Building Co., Mystic, Conn., is building, will be named Jennie R. Dubois. The vessel's dimensions are: Length over all, 275 ft.; keel, 230 ft.; breadth, 46 ft.; depth, 26 ft. The vessel has three full decks which extend her entire length. She will be launched in a few days.

The Pusey & Jones Co., Wilmington, Del., has contracted to build a steam yacht for J. Rogers Maxwell. The designs for the new yacht are by H. C. Wintringham, who designed the Kismet, owned by Mr. Maxwell. The vessel will be 170 ft. over all, 23 ft. 6 in. beam and 12 ft. 5 in. draught.

A. D. Story of Essex, Mass., has taken an order to build a wooden vessel for Capt. Sol. Jacobs of Gloucester, Mass., of the following dimensions: Length over all, 141 ft.; beam, 24 ft.; depth, 12 ft. She will have two Almy boilers. Her machinery will be supplied by Burtlesen & Petersen.

The new steamboat Nantasket, of the Nantasket Steamboat Co., was launched this week from the yard of Montgomery & Howard, Chelsea, Mass. She will be towed to the Atlantic Works, East Boston, where her machinery will be installed.

At Roach's Ship Yard, Chester, Pa., the steamship City of Memphis, building for the Savannah line, is being plated. Her engine is practically complete and will be ready long before the hull is ready to receive it.

The Iron City Sand Co., Pittsburg, Pa., is about to contract for the construction of a double-digger sand-dredge boat. The vessel will be 132 ft. long and 28 ft. wide.

A four-masted wooden schooner building by Gardner G. Deering, Bath, Me., will be launched this month. She will be christened Mary F. Barrett.

Bids are about to be invited for the construction of a steam yacht for John Jacob Astor from designs by Gardner & Cox.

W. F. Palmer of Boston is having a five-masted wooden schooner built in the Welt Ship Yard, Waldboro, Me.

WARRINGTON IRON WORKS.

The Warrington Iron Works, ship builders, boiler makers and engine builders, is a new concern, just started at the foot of West Wellington street and the north branch of the Chicago river. It has six acres of ground, of which one acre will be under cover; 24 ft. of water along the dock, with 440 ft. of water front. The new concern is owned by George Warrington, formerly of the Vulcan Iron Works, and later with the National Boiler Works of Chicago. He is a prominent member of the Chicago yacht club, owner of the steam yacht Thistle, and has designed and superintended the building of nearly fifty small craft in the past eighteen years. The new yard will be suited to the building of vessels up to 50 tons in either steel or wood. A $10,000 yacht is already under way. The new works will also furnish boilers and engines of any size for either marine or stationary use, and will make a specialty of ships' boats. The main building is about completed and the steel shed is under way. Boats will be built on a steel cradle and run into the water on a railway. This has yet to be put in. Little machinery is yet in place, as it is held back, waiting for the buildings.

EACH BOAT MUST STAND ITS OWN TEST.

The board of construction of the navy department decided at its meeting last week that all the new submarine boats should fulfill the requirements of the contract and that no single boat should be taken as a type and tried for the entire number. The decision was based on a request from the builders of the Fulton, which has recently undergone some submerging tests. They wished to use the Fulton for an acceptance test of the other boats. The construction board held that as congress authorized these vessels against the recommendations of the naval officials and stipulated in the act what requirements should be met, the navy department is bound to insist that the law be strictly carried out. The board meeting did not develop any change in the opposition of members to providing this type of war craft and the opinion was generally expressed that the boats were in an experimental stage and could not be authorized for the navy until their value had been amply demonstrated.

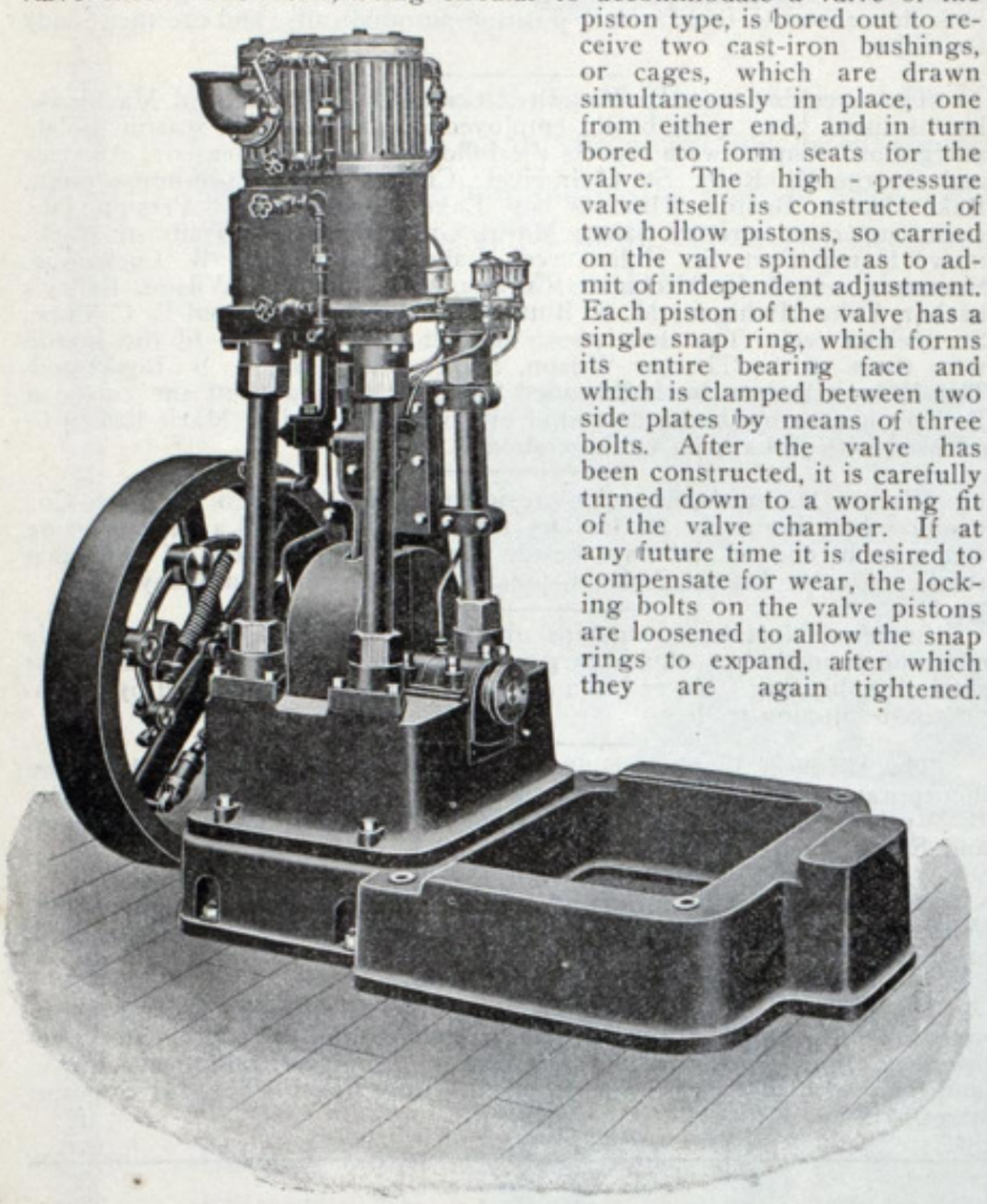
In his annual report, Gen. Supt. Kimball of the United States life saving service again urgently calls attention to the inadequate compensation of district superintendents, whom he believes to be the poorest paid officers under the government. Their salaries range from $1,500 to $1,800 per annum, and they are required to furnish bonds ranging from $10,000 to $50,000 in amount. He recommends that the compensation of each district superintendent be advanced to $2,500 per annum, which he regards as less than is paid to any officers of the government holding correspondingly responsible positions. On different occasions bills have been passed by both houses of congress substantially proposing the increase requested, but they have failed to be enacted into law.

Mr. Charles H. Darling, who succeeds Mr. Frank W. Hackett as assistant secretary of the navy, is now in Washington. Mr. Darling was born at Woodstock, Vt., in 1859, the son of a farmer. After graduating from Tuft's college, he studied law and established himself at Bennington, Vt. He is a very successful lawyer and has held many important positions in his state.

The United States coast and geodetic survey steamship Bache, recently completed by the Townsend & Downey Ship Building & Repair Co., Shooter's Island, N. Y., made a most successful trial trip this week, developing a speed of 12.3 knots, a full knot more than the contract requirements.

BUFFALO MARINE STEEPLE-COMPOUND ENGINE.

The accompanying cut illustrates a type of marine engine manufactured by the Buffalo Forge Co., Buffalo, N. Y., and recently applied to service on the great lakes. It is built on steeple-compound lines, with the high-pressure cylinder superposed upon the low-pressure cylinder. The high-pressure cylinder is cast in one piece with its lower head and valve chest. The latter, being circular to accommodate a valve of the piston type, is bored out to receive two cast-iron bushings, or cages, which are drawn simultaneously in place, one from either end, and in turn bored to form seats for the valve. The high-pressure valve itself is constructed of two hollow pistons, so carried on the valve spindle as to admit of independent adjustment. Each piston of the valve has a single snap ring, which forms its entire bearing face and which is clamped between two side plates by means of three bolts. After the valve has been constructed, it is carefully turned down to a working fit of the valve chamber. If at any future time it is desired to compensate for wear, the locking bolts on the valve pistons are loosened to allow the snap rings to expand, after which they are again tightened.



Ample space is allowed for lagging the high-pressure cylinder, which finally receives a polished corrugated covering.

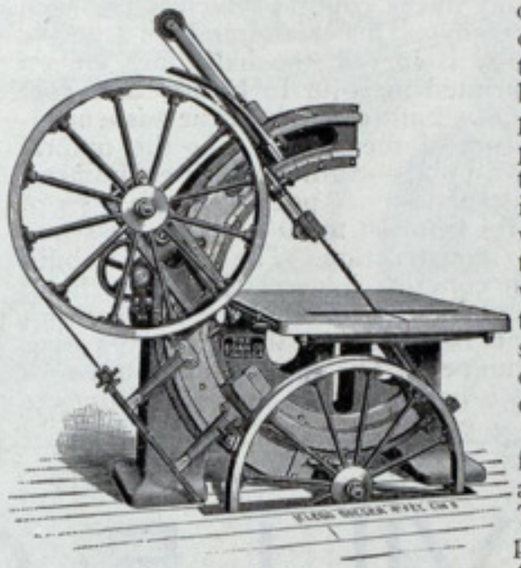
The low-pressure cylinder is fitted with a "D" slide valve carried on the same spindle with the valve above. Large port openings are provided and a removable plate gives access to the valve for adjustment. The low-pressure cylinder has the lower head cast as a part thereof, together with extensions for the attachment of the frame. The frame is composed of rods of cold rolled steel, four in number, two perpendicular ones at the rear and two in front slightly inclined. The maximum stress coming upon any one of these rods, of course, but slightly exceeds in value one-fourth of the maximum piston rod stress, and hence it will be apparent that in this style of frame-construction a very high factor of safety is combined with maximum accessibility of the moving parts. This solidity affords also freedom from vibration, which feature is further enhanced by the mode employed for securing the rods to the head and base. On both ends of the several rods a large jamb-nut firmly holds a triangular pad, which is itself bolted to the base or the low-pressure head flange, as the case may be. On the two rear posts is bolted the guide plate, and though the direction of rotation is such that the guide pressure is always taken up by this plate, the cross-head shoe is fitted with auxiliary enclosing guides bolted to the main guide plate. The connecting road at its upper part has a forked end, while the other end is of the locomotive strap and wedge type. The crank shaft is of forged steel, large in diameter, with long bearings in the base and is provided with counter weighted crank discs.

The base is carried on a sub-base, which gives the fly-wheel the proper floor clearance, and which, in this instance is arranged for directly connecting to the engine an Elwell-Parker Electric Co. generator. Close regulation is afforded by a governor of the centrifugal fly-wheel type, and by reason of its three means of adjustment, together with the provision of oil or grease cups on all the governor pins and on the various bearing surfaces of the valve motion as well, great sensitiveness may be secured. Abundant lubrication is characteristic of the engine and is had by a series of sight-feed oil cups, feeding the rubbing surfaces through brass tubing. The arrangement is such as to cause the oil after use to drain into the crank pit, whence it may be drawn and filtered as desired. In the engraving is shown the device for trapping the oil escaping from the outer ends of the main journals. The lubricant from the end of the bearing is guided by a plate into a narrow receptacle on the outside of the bed, from which connection is made with the crank pit. In order to prevent the projection of any particles of oil from the rotating parts, a light polished hood is furnished, as shown. The material used in the building of this engine is the very best, and in point of nicety of construction and finish it is in perfect keeping with the best marine engine practice.

SHIP BUILDERS' BAND SAW.

We illustrate a machine just brought out by the J. A. Fay & Egan Co. of Nos. 325 to 345 West Front street, Cincinnati, O. It is their new No. 8 band ship saw.

This ship saw is constructed on an entirely new principle, and was specially designed for sawing different angles on ship timbers. The departure from the old method of doing this kind of work on a tilting table is a radical one, which favorably presents itself immediately to the practical eye of the ship builder. The points enabling this machine to thoroughly and accurately perform its work with rapidity are that both wheels are made to move on a radius, the center of which is the point at which the blade passes through the top of the table, and a clearly stamped index within sight of the operator enables him to immediately designate the angle of cut.



New Band Ship Saw.

The beveling device is under perfect control, and can be set at any angle to 45° and reversed instantly. The machine is heavy, perfectly proportioned and of sufficient floor space to insure steady running, with the blade set at any angle. An ingenious device, very sensitive under all conditions, controls the tension of the saw blade. Any of our readers who may be interested can obtain prices and full particulars by applying to the manufacturers, who will also be pleased to furnish their new 450-page illustrated catalogue, showing each and every machine they make.

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A Word to the Advertiser.

THE annual ship building number of the Marine Review will be published on Jan. 9 next. In these annual editions are chronicled the current construction in the ship yards of the United States—not so much what has been built during the year but what is actually under way at the present time. It will be a living directory of the active yards. The value of this number to the manufacturer of ship yard equipment and supplies for ships cannot be overestimated. He can reach the entire market in this issue.

The advertising rates for this issue are:

Full page, - $40
Half page, - $25
Quarter page, $15

As the edition is to be issued January 9th, it will be necessary to reserve space at once.

The number will be beautifully printed and illustrated throughout, and will have a special cover in several colors. It will undoubtedly be the finest number that has ever been issued by a marine publication in the United States. The circulation of this number will be of the widest possible character. Indeed its circulation may be said to be complete, for it will reach everyone identified with ship building and ship owning in the United States.

Especial pains will be taken to make the edition attractive throughout. To this end the Marine Review will gladly design the advertising for its patrons free of charge. All it asks is the raw material in the shape of catalogues, photographs or other information.

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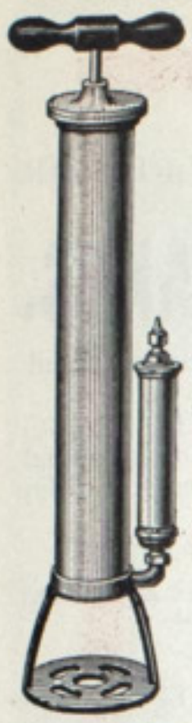

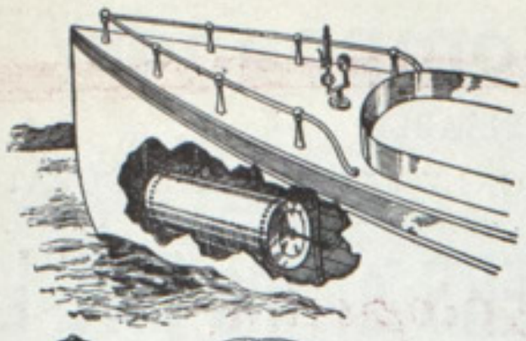

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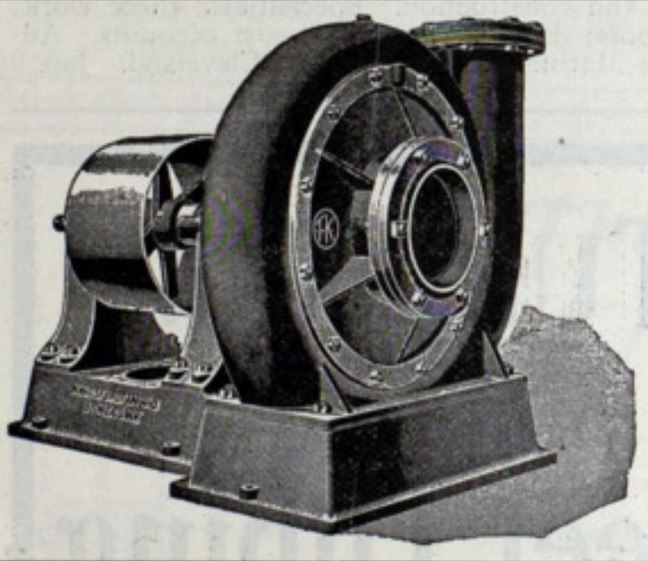

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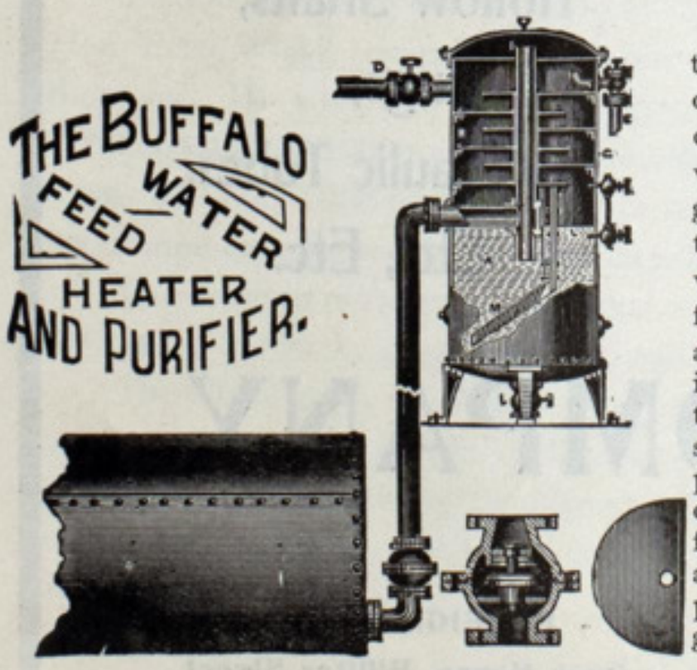

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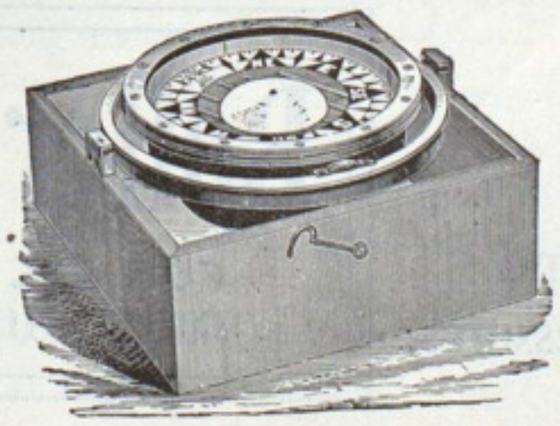

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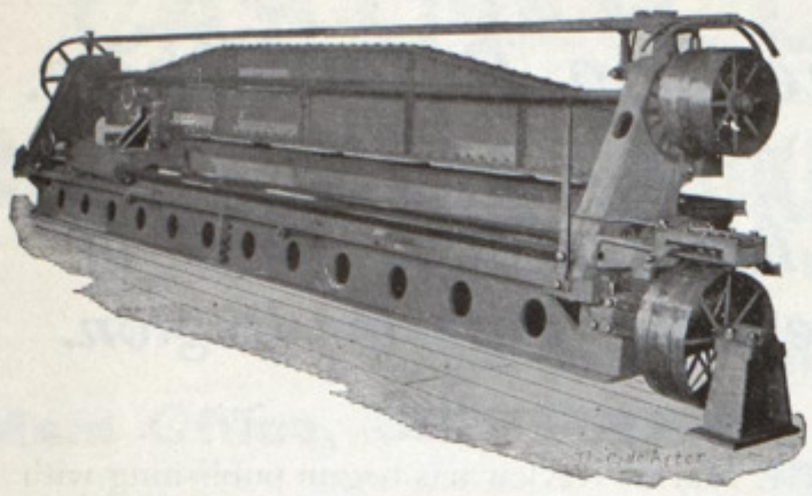

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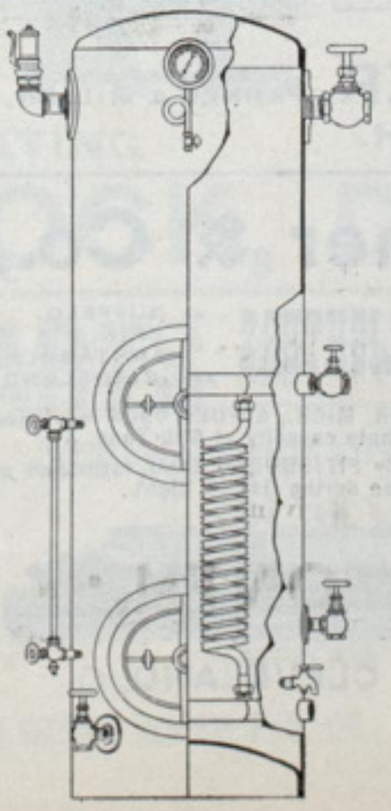

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OAKUM.
Stratford Oakum Co., Geo.....Jersey City, N. J.

OILS AND LUBRICANTS.
Dixon Crucible Co., Joseph.....Jersey City, N. J.
Standard Oil Co.....Cleveland.

PACKING.
Crane Co.....Chicago.
Garlock Packing Co.....Palmyra, N. Y.
Jenkins Bros.....New York.
Katzenstein, L. & Co.....New York.
Sayen & Schultz.....Philadelphia.
U. S. Metallic Packing Co.....Philadelphia.

PAINTS.
Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

PATENT ATTORNEYS.
Thurston & Bates.....Cleveland.

PATTERN SHOP MACHINERY.
Atlantic Works, Inc.....Philadelphia.

PIPE, WROUGHT IRON.
Bourne-Fuller Co.....Cleveland.
Crane Co.....Chicago.

PLANERS OF ALL KINDS.
Bement, Miles & Co.....Philadelphia.
Niles Tool Works Co.....Hamilton, O.

PLANING MILL MACHINERY.
Atlantic Works, Inc.....Philadelphia.

PLATE BENDING AND PLANING MACHINES.
Bement, Miles & Co.....Philadelphia.
Cleveland Punch & Shear Works Co.....Cleveland.
Niles Tool Works Co.....Hamilton, O.
Wood & Co., R. D.....Philadelphia.

PLUMBING, MARINE.
Reilly Repair & Supply Co., James.....New York.
Sands, Alfred B. & Son.....New York.

PNEUMATIC TOOLS.
Standard Pneumatic Tool Co.....Chicago.

POLISH FOR METALS.
Bertram's Oil Polish Co.....Boston.

POWER DOORS AND HATCHES.
"Long Arm" System Co.....Cleveland.

PRESSURE REGULATORS.
D'Este Co., Julian.....Boston.
Kieley & Mueller.....New York.

PROPELLER WHEELS.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Shipbuilding Co.....Detroit.
Farrar & Trefts.....Buffalo.
Fore River Ship & Engine Co.....Quincy, Mass.
Hardy, John B.....Tacoma, Wash.
Hyde Windlass Co.....Bath, Me.
Harlan & Hollingsworth Co.....Wilmington, Del.
Hodge, S. F. & Co.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mnfg. Co.....East Boston, Mass.
MacKinnon Mfg. Co.....Bay City, Mich.
Maryland Steel Co.....Sparrow's Point, Md.
Moran Bros. Co.....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Philadelphia.
Newport News Ship Building Co.....Newport News, Va.
Nixon, Lewis.....Elizabeth, N. J.
Phosphor Bronze Smelting Co., Ltd.....Philadelphia.
Pusey & Jones Co.....Wilmington, Del.
Risdon Iron Works.....San Francisco.
Roelker, H. B.....New York.
Sheriffs Mnfg. Co.....Milwaukee.
Standard Ship Building Co.. .....Perth Amboy, N. J.
Trigg, Wm. R. Co.....Richmond, Va.
Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.
Badt-Goltz Engineering Co.....Chicago.
Elwell-Parker Electric Co.....Cleveland.
Fort Wayne Electric Works.....Fort Wayne, Ind.
General Electric Co.....Schenectady, N. Y.
Rushmore Dynamo Works.....Jersey City, N. J.
Seidler-Miner Electric Co.....Detroit.
Westinghouse Electric & Mnfg. Co.....Pittsburg.

PUMPS FOR VARIOUS PURPOSES.
Blake, Geo. F. Mnfg. Co.....New York.
Kingsford Foundry & Machine Works....Oswego, N. Y.
Wood, R. D. & Co.....Philadelphia.
Worthington, Henry R.....New York.

PUNCHES, RIVETERS, SHEARS.
Bement, Miles & Co.....Philadelphia.
Cleveland Punch & Shear Works Co.....Cleveland.
Niles Tool Works Co.....Hamilton, O.
Wood, R. D. & Co.....Philadelphia.

REFRIGERATING APPARATUS.
American Linde Refrigeration Co.....New York.
Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.
Great Lakes Register.....Cleveland.

RELEASING HOOKS FOR DETACHING BOATS.
Standard Automatic Releasing Hook Co.....New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.
Bourne-Fuller Co.....Cleveland.
Champion Rivet Co.....Cleveland.

RIGGING ROPE (WIRE).
American Steel & Wire Co.....Chicago.

RUBBER GOODS.
Hale Rubber Co., Alfred.....So. Boston, Mass.

RUBBER INSULATED WIRES.
American Steel & Wire Co.....Chicago.
Roebling's Sons, John A.....New York and Cleveland.

SAFETY VALVES.
American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crosby Steam Gage & Valve Co.....Boston.

SAIL MAKERS.
Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.
Wilson & Silsby.....Boston.

SALVAGE COMPANIES.
See wrecking companies.

SEARCH LIGHTS.
Badt-Goltz Engineering Co.....Chicago.
Elwell-Parker Electric Co.....Cleveland.
Fort Wayne Electric Works.....Fort Wayne, Ind.
General Electric Co.....Schenectady, N. Y.
Rushmore Dynamo Works.....Jersey City, N. J.
Seidler-Miner Electric Co.....Detroit.
Westinghouse Electric & Mnfg. Co.....Pittsburg.

SHAPERS.
Bement, Miles & Co.....Philadelphia.
Niles Tool Works Co.....Hamilton, O.
Pratt & Whitney Co.....Hartford, Conn.

SHEARS.
See punches, riveters and shears.

SHIP AND BOILER PLATES AND SHAPES.
Bourne-Fuller Co.....Cleveland.

SHIP BUILDERS.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Shipbuilding Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Hardy, John B.....Tacoma, Wash.
Harlan & Hollingsworth Co.....Wilmington, Del.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mnfg. Co.....East Boston, Mass.
Maryland Steel Co.....Sparrow's Point, Md.
Moran Bros. Co.....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Philadelphia.
Newport News Ship Building Co.....Newport News, Va.
Nixon, Lewis.....Elizabeth, N. J.
Pusey & Jones Co.....Wilmington, Del.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Standard Ship Building Co.. .....Perth Amboy, N. J.
Trigg, Wm. R. Co.....Richmond, Va.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.
Baker, Howard H. & Co.....Buffalo.
Moran Bros. Co.....Seattle, Wash.
Reilly Repair & Supply Co., James.....New York.
Upson-Walton Co.....Cleveland.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

SOUNDING APPARATUS.
Farr, C. W.....Chicago.

SPARS—LARGE SIZES.
Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSEL FOR SALE.
Holmes, Samuel.....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.
American Line.....New York.
Cleveland & Buffalo Transit Co.....Cleveland.
Clyde Line.....New York.
Dominion Line.....Boston.
Erie & Western Trans. Co.....Buffalo.
International Nav. Co.....Philadelphia.
Red Star Line.....New York.

STEEL CASTINGS.
Seaboard Steel Casting Co.....Chester, Pa.

STEERING APPARATUS.
American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Detroit Shipbuilding Co.....Detroit.
Electro-Dynamic Co.....Philadelphia.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Queen City Engineering Co.....Buffalo.
Sheriffs Mnfg. Co.....Milwaukee.

STOCKS, BONDS, SECURITIES.
Wright, Herbert & Co.....Cleveland.

SUBMARINE DIVING APPARATUS.
Hale Rubber Co., Alfred.....So. Boston, Mass.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.
Holmer & Goodenough.....New York.
Gaskin, Edward.....Buffalo.
See, Horace.....New York.
Wood, W. J.....Chicago.

TELEGRAPH—DECK AND ENGINE ROOM.
Cory, Chas. & Son.....New York.

TESTS OF MATERIAL.
Hunt, Robert W. & Co.....Chicago.
Pittsburgh Testing Laboratory, Ltd.....Pittsburg.

THERMOMETERS FOR MECHANICAL PURPOSES.
Helios-Upton Co.....Peabody, Mass.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.
Bement, Miles & Co.....Philadelphia.
Cleveland Punch & Shear Works Co.....Cleveland.
New Doty Mnfg. Co.....Janesville, Wis.
Niles Tool Works Co.....Hamilton, O.
Pond Machine Tool Co.....Plainfield, N. J.
Pratt & Whitney Co.....Hartford, Conn.
Standard Pneumatic Tool Co.....Chicago.
Watson-Stillman Co.....New York.
Wood, R. D. & Co.....Philadelphia.

TOOLS, WOOD WORKING.
Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.
American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.
Donnelly Salvage & Wrecking Co.....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.....Midland, Ont.
Swain Wrecking Co.....Detroit.

TRAPS, STEAM.
D'Este Co., Julian.....Boston.
Haines Co., Wm. S.....Philadelphia.
Kieley & Mueller.....New York.

TRUCKS.
Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.
Benedict & Burnham Mnfg. Co.....Waterbury, Conn.
Standard Seamless Tube Co.....Pittsburg.

VALVES, STEAM SPECIALTIES, ETC.
American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crane Co.....Chicago.
Crosby Steam Gage & Valve Co.....Boston.
D'Este Co., Julian.....Boston.
Jenkins Bros.....New York.
Kieley & Mueller.....New York.
Wood & Co., R. D.....Philadelphia.

VARNISH PAINT.
Mair, John & Son.....Philadelphia.

VESSEL AND FREIGHT AGENTS.
Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Chamberlain & Co., S. R.....Chicago.
Drake & Maytham.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Hall & Root.....Buffalo.
Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
Keith, J. G. & Co.....Chicago.
Kennedy, Hunter & Co.....Antwerp.
Mitchell & Co.....Cleveland.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Tandy, Frank N.....Boston.

VENTILATING APPARATUS FOR SHIPS.
American Blower Co.....Detroit.
Boston Blower Co.....Hyde Park, Mass.
Buffalo Forge Co.....Buffalo.
Sturtevant, B. F. Co.....Boston.

WIRE ROPE AND WIRE ROPE FITTINGS.
American Steel & Wire Co.....Chicago.
Baker, H. H. & Co.....Buffalo.
Roebling's Sons, John A.....New York and Cleveland.
Upson-Walton Co.....Cleveland.

WHISTLES, STEAM.
American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crosby Steam Gage & Valve Co.....Boston.

WINDLASSES.
American Ship Windlass Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.

WINCHES.
American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.
Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.
Donnelly Salvage & Wrecking Co.....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.....Midland, Ont.
Swain Wrecking Co.....Detroit.

YACHT SAILS, FITTINGS, HARDWARE, ETC.
Wilson & Silsby.....Boston.

YACHT AND BOAT BUILDERS.
Drein, Thos. & Son.....Wilmington, Del.
Gas Engine & Power Co.....New York.
Lane & DeGroot.....Brooklyn.
Willard, Chas. P. & Co.....Chicago.

YAWLS.
Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Brooklyn.

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No. 22,	Lake Shore Limited	*2 15 am	*2 20 am
No. 26,	Chicago & Cleveland Express	*7 30 am	.....
No. 28,	New York & Boston Express	*7 40 am	*8 00 am
No. 40,	Toledo & Buffalo Accom.	†10 00 am	†11 40 am
No. 32,	Fast Mail	*11 25 am	*11 30 am
No. 44,	Accommodation, via Sandusky	†1 35 pm	.....
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No. 46,	Southwestern Express	.....	*3 10 pm
No. 6,	Limited Fast Mail	*5 40 pm	*5 45 pm
No. 10,	Chicago, New York & Boston Special	*7 35 pm	*7 45 pm
No. 16,	New England Express	*10 30 pm	*10 35 pm
No. 2,	Day Express	†9 05 pm	†9 20 pm
No. 126,	Norwalk Accommodation	†7 55 am	.....
No. 40,	Toledo & Buffalo Accom., via Norwalk	†10 00 am	†11 40 am
No. 106,	Conneaut Accommodation	.....	†4 30 pm
	Westward:—	Ar. fr. East.	Dep. West.
No. 11,	Southwestern Limited	*3 25 am	.....
No. 15,	New York, Boston & Chicago Special	*3 05 am	*3 10 am
No. 21,	New York & Chicago Express	*5 10 am	*5 20 am
No. 7,	Day Express	.....	†6 30 am
No. 19,	The Lake Shore Limited	*7 35 am	*7 40 am
No. 23,	Western Express	*11 10 am	*11 15 am
No. 33,	Southwestern Express	*12 25 pm	.....
No. 133,	Cleveland & Detroit Express	.....	*12 45 pm
No. 47,	Accommodation	.....	†3 00 pm
No. 141,	Sandusky Accommodation	.....	†3 10 pm
No. 127,	Norwalk Accommodation	.....	†5 10 pm
No. 37,	Pacific Express	*7 00 pm	*7 20 pm
No. 25,	Southern Express	*9 30 pm	.....
No. 3,	Fast Mail Limited	*10 50 pm	*10 55 pm
No. 115,	Conneaut Accommodation	†8 30 am	.....

*Daily. †Daily except Sunday. Trains Nos. 28 and 37 run via Erie station.

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SCHEDULE.

Lv. CLEVELAND, Daily except Sunday.....12:35 p. m.
Lv. COLUMBUS, Daily except Sunday..... 4:20 p. m.
Lv. SPRINGFIELD, Daily except Sunday..... 5:35 p. m.
Lv. DAYTON, Daily except Sunday..... 6:12 p. m.
Ar. CINCINNATI, Daily except Sunday..... 7:50 p. m.
Ar. JACKSONVILLE, Daily except Monday..... 8:15 p. m.
Ar. ST. AUGUSTINE, Daily except Monday..... 9:30 p. m.

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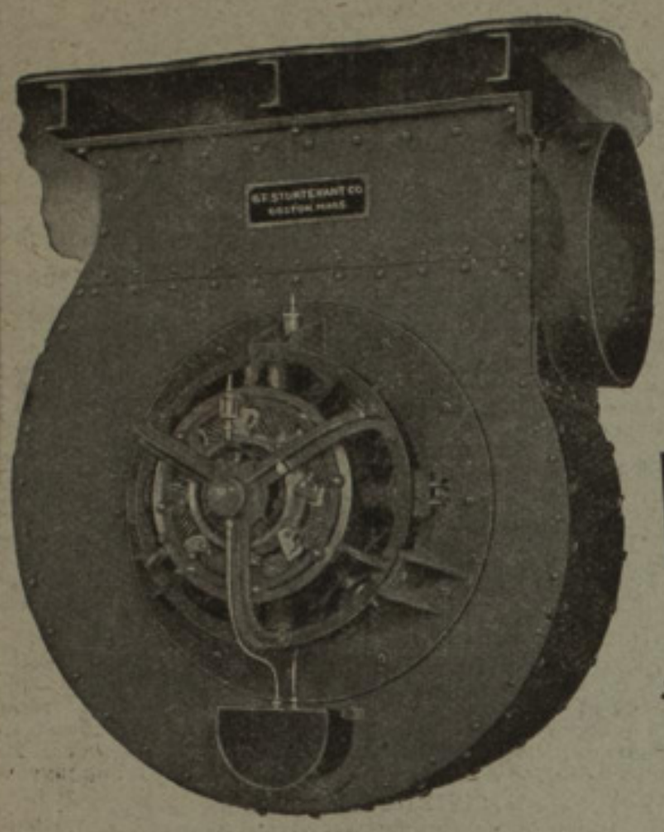

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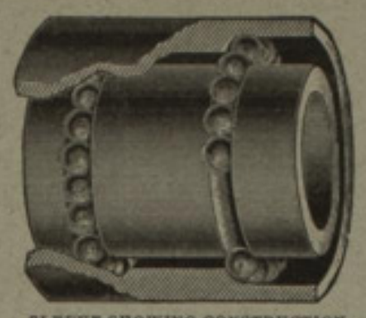

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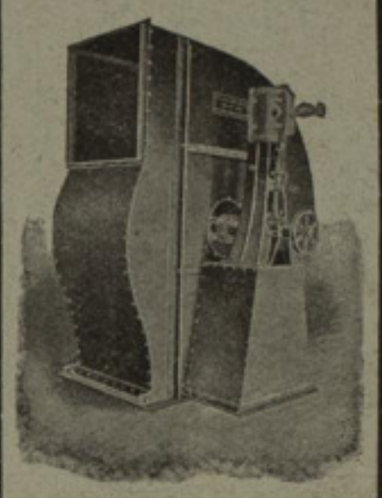

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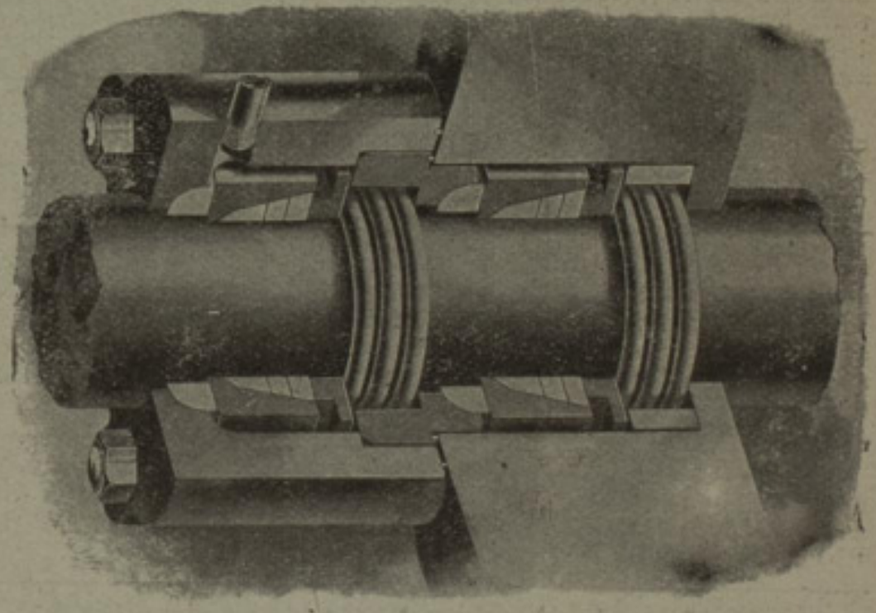

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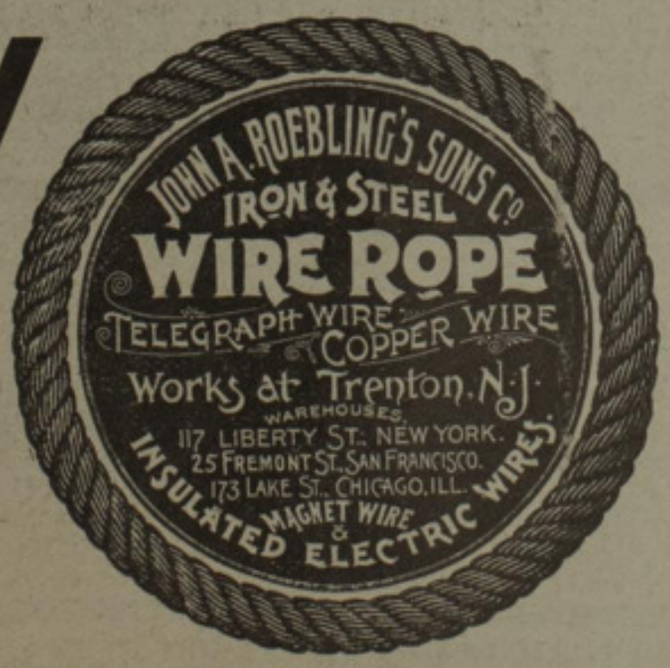

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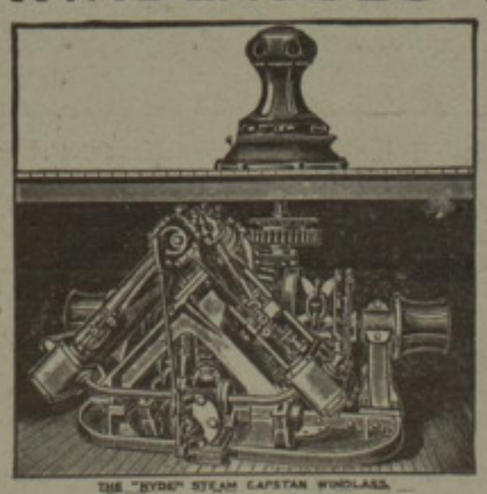

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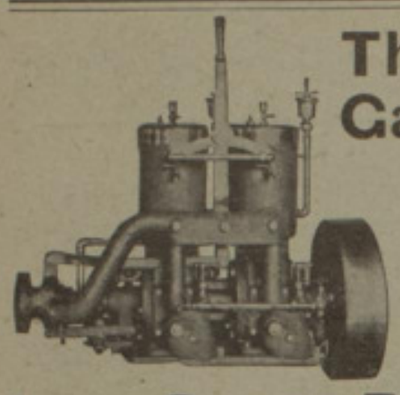

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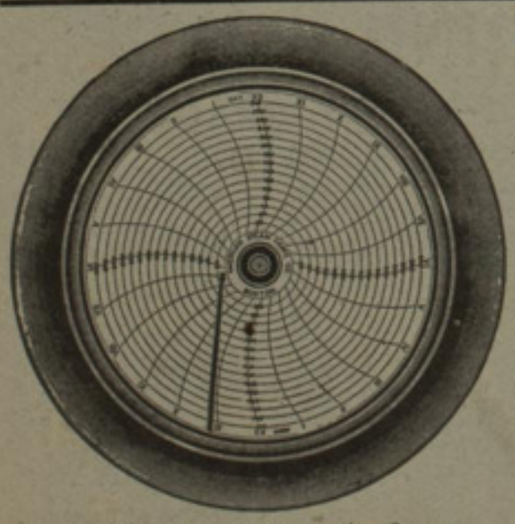

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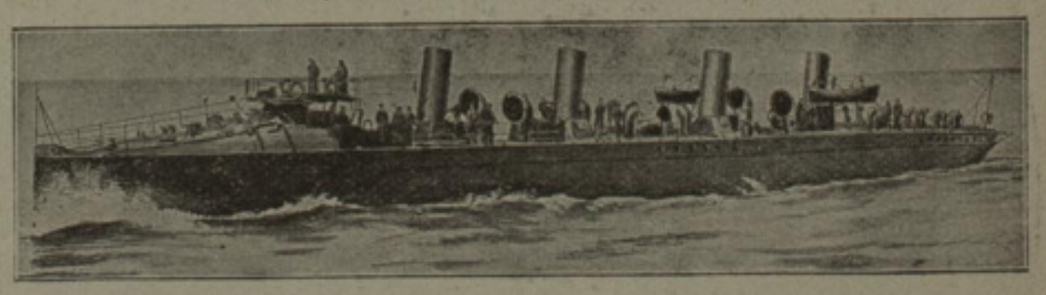

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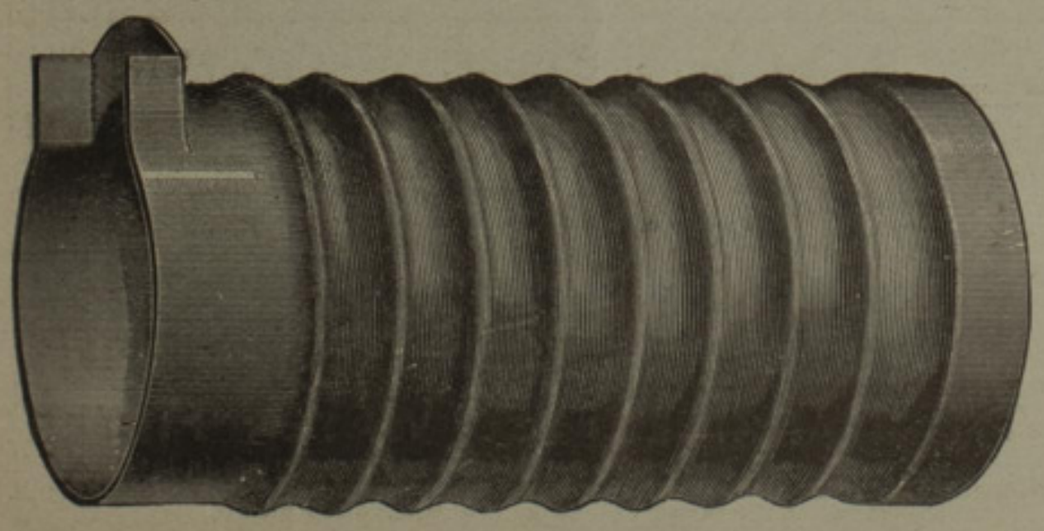

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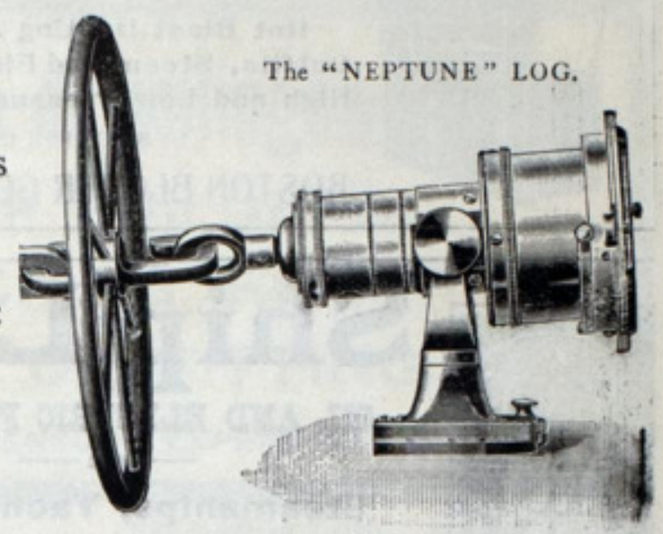

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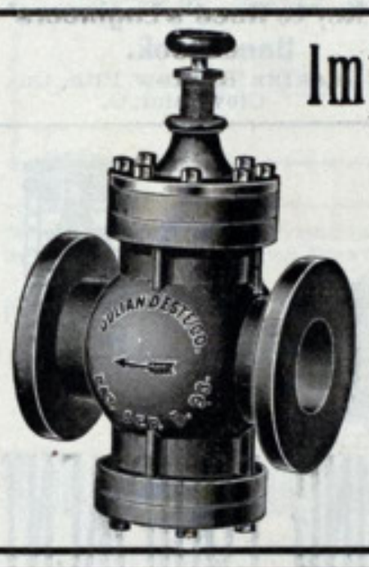

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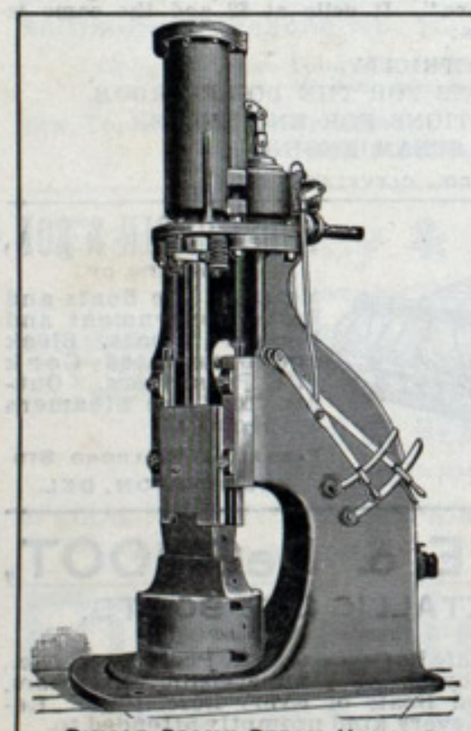

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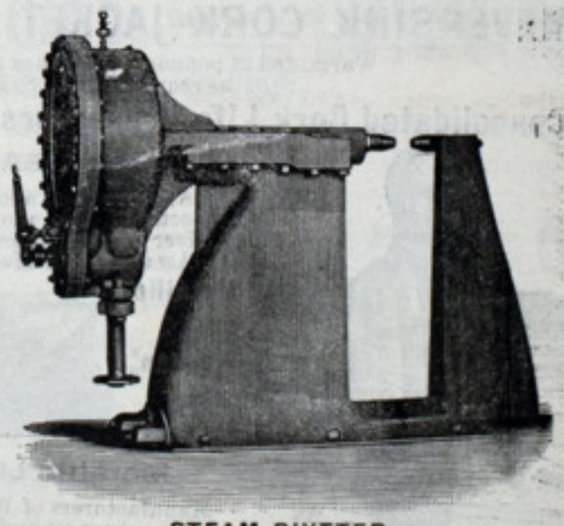

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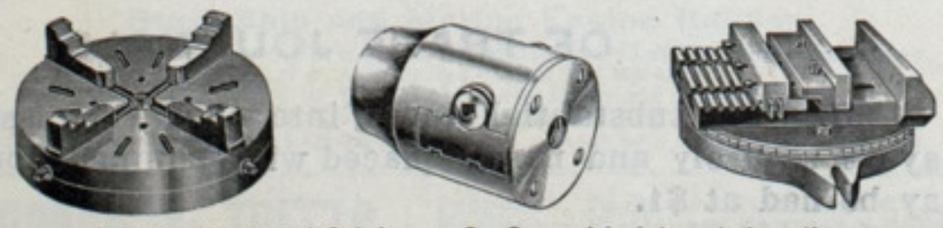

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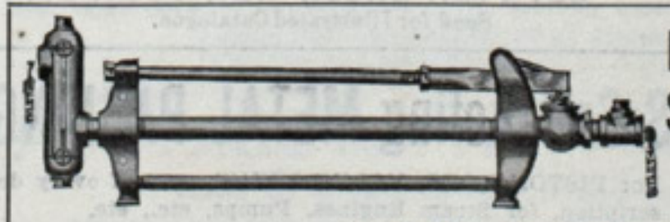

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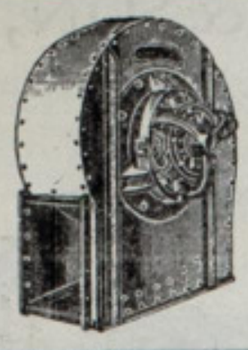

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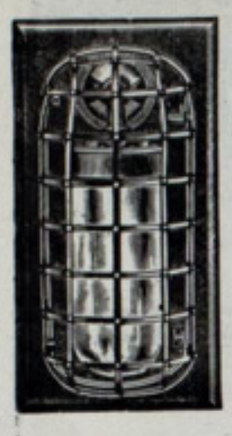

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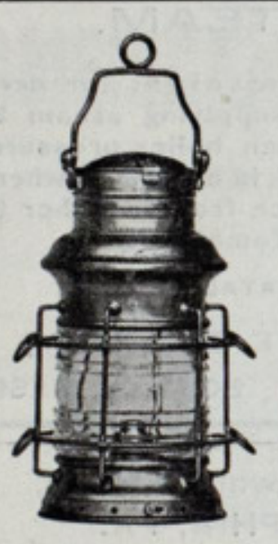

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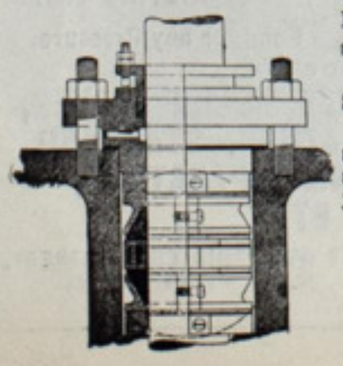

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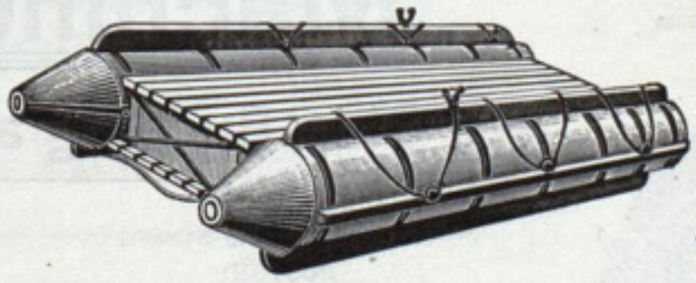

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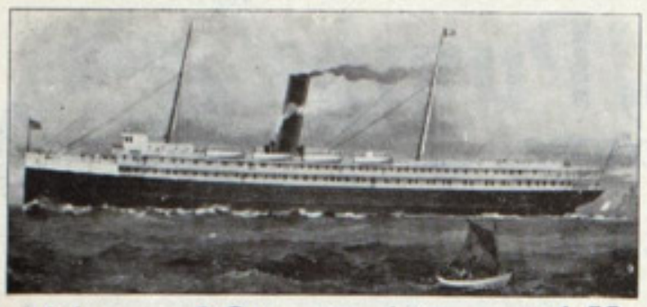

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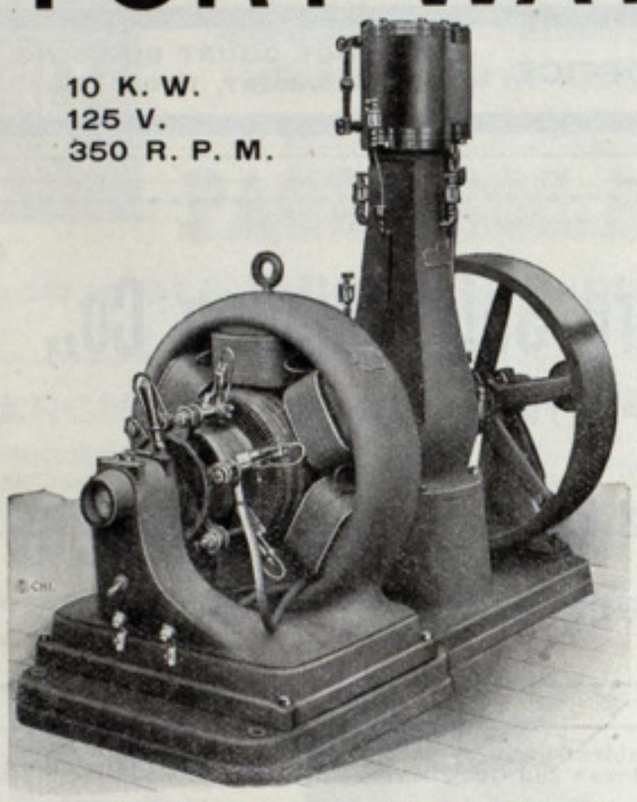

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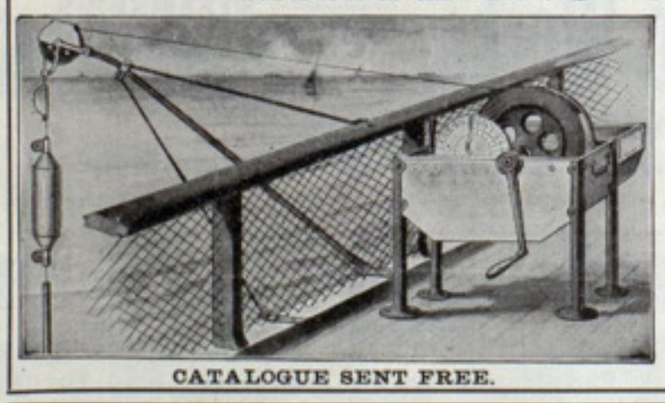

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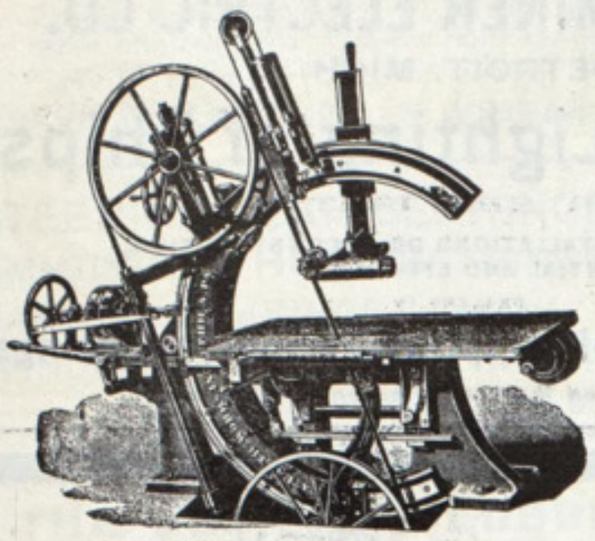

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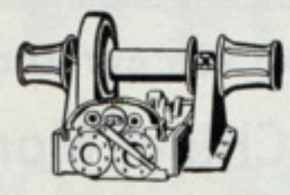

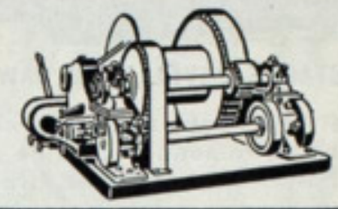

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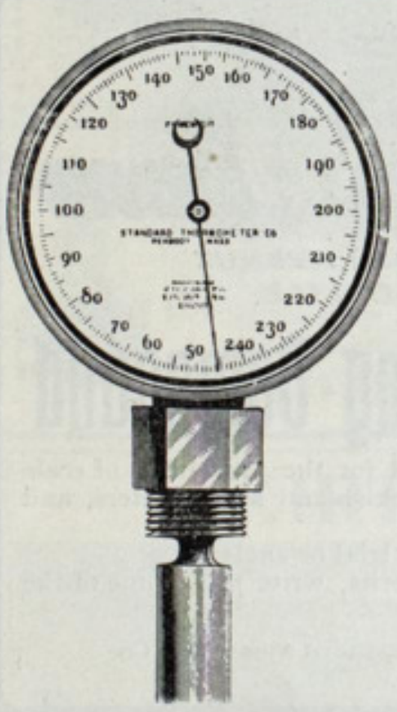

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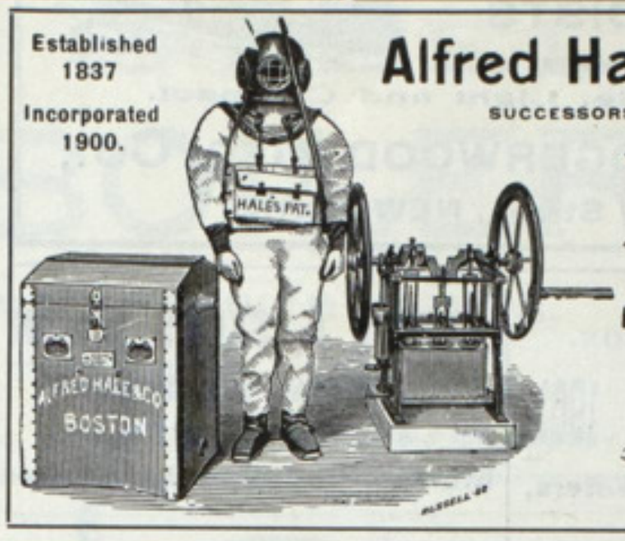

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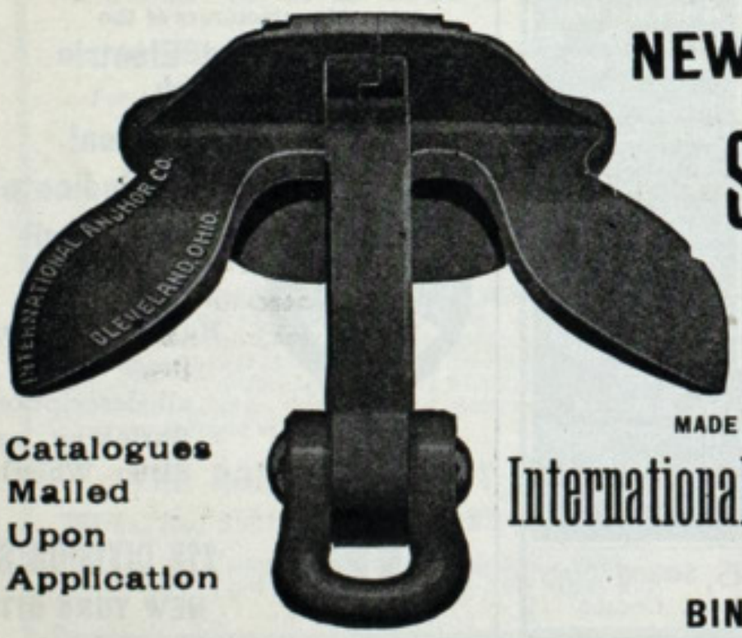

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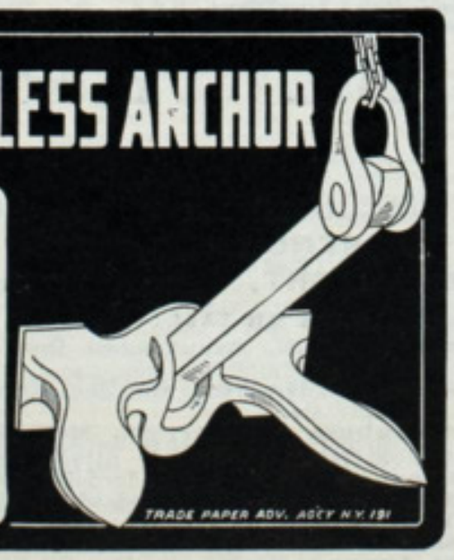

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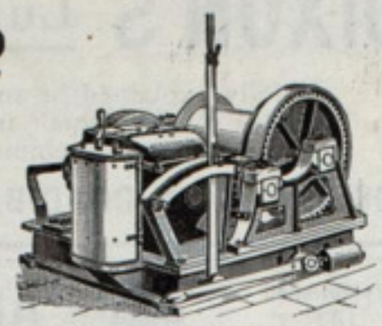

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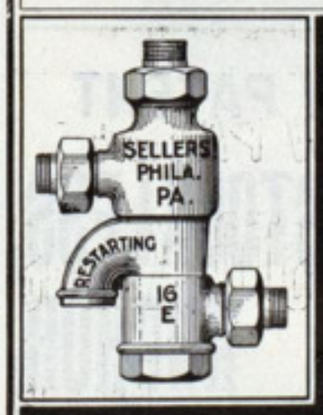

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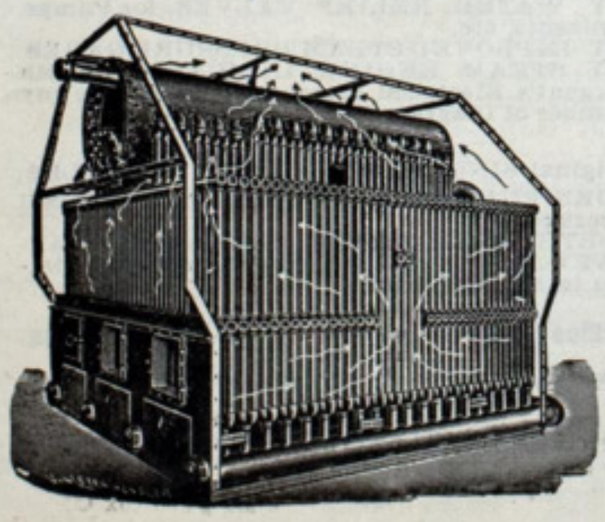

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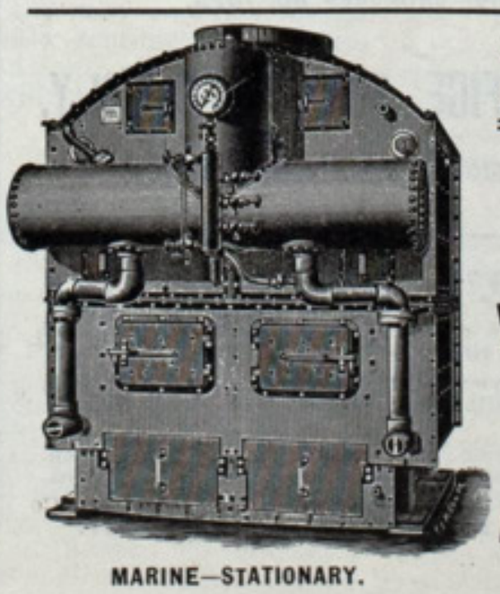

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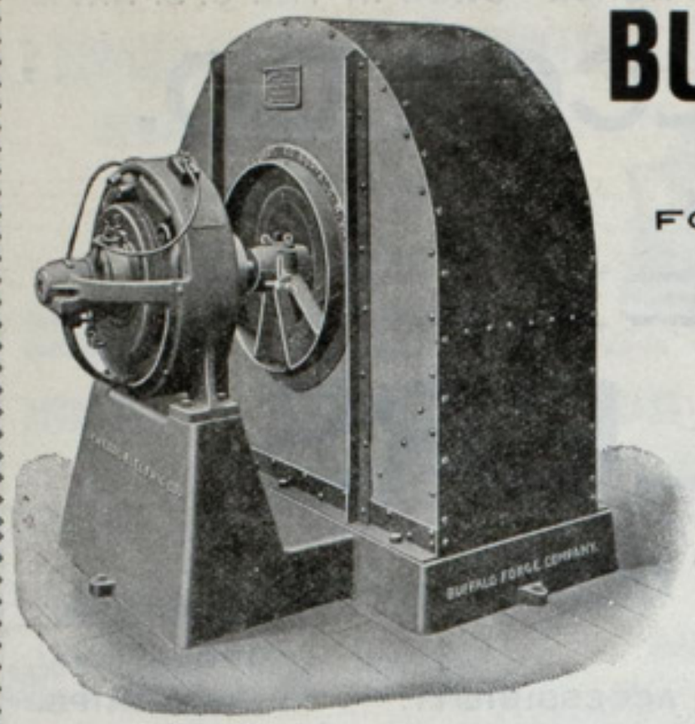

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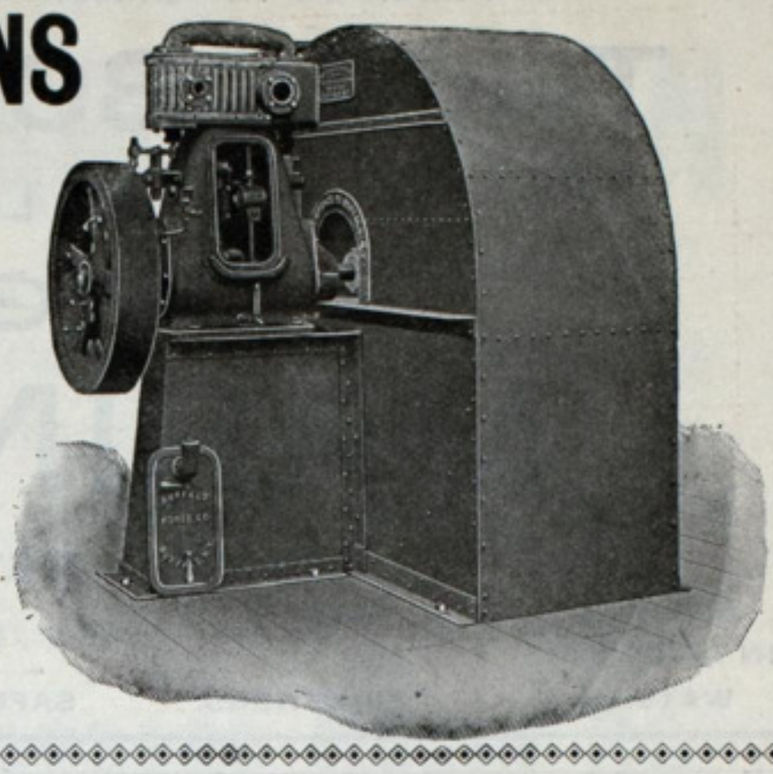

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